DOCUMENT RESUME

ED 195 775 CE 027 440

AUTHOR Springer, Judith W., Ed.
TITLE Issues in Career and Human Resource Development. Research Papers from the ASTD National Conference (St. Louis, Missouri, 1979). ASTD Research Series. Paper No. 5.
INSTITUTION American Society for Training and Development, Madison, Wis.
PUB DATE 80
NOTE 171p.
AVAILABLE FROM American Society for Training and Development, P.O. Box 5307, Madison, WI 53705 ($9.50, ASTD members: $11.95, non-members: plus $0.85 shipping).

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS Career Change: *Career Development: Career Education: Cognitive Style: Creativity: Experiential Learning: *Females: Generalization: Guidelines: *Human Resources: Individual Development: Information Seeking: *Job Skills: *Labor Force Development: Occupational Mobility: Problem Solving: *Transfer of Training: Vocational Adjustment: Work Experience
IDENTIFIERS Occupational Adjustment

ABSTRACT

This book contains six presentations from the American Society of Training and Development National Conference in St. Louis. The paper, Career Development, Personal Growth, and Experiential Learning, sees learning as the central task of career development, with experiential learning theory providing a framework for mapping career changes and a context for changing needs for personal development. Problem Solving, Creativity, and Cognitive Style examines factors entering into creative problem solving. Two aspects of creative problem solving are discussed which are related to individual differences in cognitive styles. Occupational Adaptability and Transferable Skills: Preparation for Tomorrow's Career discusses the need for a variety of skills and abilities (developed through both work and non-work experiences) and occupational adaptability and flexibility and relates them to the current research program at the National Center for Research in Vocational Education. Situational Influences on Women's Career Development explores situation variables, such as social-structural and life cycle. Training: A Means, Not an End suggests selecting intended results in terms of current and future societal requirements. Demystifying Research in Human Resource Development--Simplified Research Guidelines provides a set of systematic procedures for obtaining information when there are not enough resources to conduct a full-scale study. (YLB)

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ED195775

Issues in Career and Human Resource Development

Research Papers from the 1979 ASTD National Conference

Judith W. Springer
EDITOR

CE 027 440

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"Career Development, Personal Growth, and Experiential Learning" by Donald Wolfe and David Kolb was published in *Organizational Psychology: A Book of Readings* by Kolb, Rubin and McIntyre, Third Edition, Prentice-Hall, 1979, pp. 535-563. Reprinted by permission.

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Versions of Tables 4 and 5 in "Situational Influences On Women's Career Development" by P. Kay Coleman, Barbara Strudler Wallston and Norma Calway-Fagen previously appeared in *Sex Roles* published by Plenum Publishing Corp. Reprinted by permission.

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Library of Congress Cataloging in Publication Data

American Society for Training and Development
Issues in career and human resource development.

(ASTD research series ; paper no. 5)
Includes bibliographies.

1. Employees, Training of—Congresses. 2. Vocational guidance — Congresses. I. Springer, Judith W., 1938- II. Title III. Title: Career and human resource development. IV. Series: American Society for Training and Development. ASTD research series ; no. 5.

HF5549.5.T7A59 1980 650.1'4 80-21971

Manufactured in the United States of America

Published by American Society for Training and Development
P.O. Box 5307, Madison, Wisconsin 53705

FOREWORD

In support of its mission to encourage and disseminate research that is useful to practicing training and development professionals, the ASTD Research Committee annually invites researchers to present work at the National Conference. This book contains papers representing six of the eight Research-sponsored presentations at the 1979 ASTD National Conference in St. Louis.*

Special thanks are due to the following individuals for assisting in the Conference presentations and in the preparation of this book:

The authors and presenters of the research papers themselves, for their willingness to share their work with others in the human resource development community.

The 1979 ASTD Research Committee serving under my leadership, for their work in planning the Conference

*The other two presentations were: 1) A report by Jay Alden and Ruth Salinger on the 1978 Research Seminar. This entire Seminar is now represented by the ASTD book entitled *Determining the Payoff of Management Training*, edited by Richard O. Peterson (ASTD, 1979). 2) "International Computerized Supervisory Assessment," presented by Professor Jorge Chapiro of Sao Paulo, Brazil. No material is yet available for publication on this ongoing development effort.

program, and in selecting these papers from among the many submitted for presentation:

Jay Alden, Xerox Corporation
Mike Hammer, then of General Motors, now of Mobil
Stephanie Jackson, Independent Consultant
Donna McNamara, C & P Telephone
Richard O. Peterson, AT&T
Geary Rummler, Praxis Division of Kepner-Tregoe
Ruth Salinger, U.S. Office of Personnel Management

Robert Craig, Director of Communications, ASTD, for his continued support of the work of the Research Committee.

Denise Cavanaugh, Chair of the Design Committee for the 1979 ASTD Conference, for her support of the research presentations as an integral part of the Conference.

Virginia Scofield, of the Athena Corporation, who has assisted me throughout the year with Committee, Seminar, and book coordination.

Catherine Rossbach, ASTD Manager of Professional Publishing, who has provided much appreciated continuing support for the year's book publications.

Jack Thomas, my husband, who has provided indispensable personal support.

My sincere thanks to all of you.

Judith W. Springer
The Athena Corporation
Bethesda, Maryland
June, 1980

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CAREER DEVELOPMENT, PERSONAL GROWTH, AND EXPERIENTIAL LEARNING

Donald M. Wolfe
David A. Kolb

SUMMARY

The central task of career development is *learning*, in the broadest adaptive sense of developing throughout life the knowledge, skills and attitudes necessary for effective performance at work and for satisfaction in one's total life situation. Learning is not only a process of responding to these immediate situational demands; it also includes making choices and decisions to shape one's future. Experiential learning theory provides a framework for mapping career paths, as well as a context for the specific challenges of life-long learning and our changing needs for personal development.

Career development involves one's whole life, not just occupation. As such, it concerns the whole person — needs and wants, capacities and potentials, excitements and anxieties, insights and blindspots, warts and all. More than that, it concerns him/her in the ever-changing contexts of his/her life. The en-

vironmental pressures and constraints, the bonds that tie him/her to significant others, responsibilities to children and aging parents, the total structure of one's circumstances are also factors that must be understood and reckoned with. In these terms, career development and personal development converge. Self and circumstance — evolving, changing, unfolding in mutual interaction — constitute the focus and the drama of career development.

Current Perspectives on Learning and Adult Development

The overwhelming bulk of the theory and research on personality development has focused on childhood stages and processes. Since the time of Freud's early work on psychosexual development, the emphasis even among researchers with quite different theoretical orientations (e.g., Piaget) has been on the impact of early experiences and maturational factors on the structure of adult personality, which is presumably quite stable, past adolescence. This is in keeping with our general cultural orientation, which treats the first 20 plus years as formative, after which one is, or should be, "mature." The predominant structures of both family life and our educational system are geared to these assumptions.

Primary and secondary education and much of college are aimed toward the acquisition of broad areas of knowledge and skills which can be applied to many fields of work; specialized training through trade or professional schools or apprenticeships for a specific career is, in educational terms, the last formative step toward becoming a full adult. The implicit assumption is that one can learn by the mid-twenties

those things one needs to know to pursue a successful life career, in spite of our common knowledge that job changes are frequent and often necessary later in life.

In recent years there has been a growing interest in more differentiated views of career development, recognizing that "success" often leads to promotions which require new knowledge and competencies and that "failures" may require a new start in a different field. In any event, the earlier assumptions are oversimplified and distressingly off-target — people can and do learn and develop throughout their life spans, and there are many significant turns in the road which require new learning for many, if not all, career paths. Maturity in life and career is more appropriately viewed as a continuing process of unfolding than as a status achieved once and for all.

The scientific study of personality development, in spite of its major emphasis on the childhood years, has in recent years begun to address the processes of growth throughout the life cycle. In 1950 Erikson published the first of several seminal works on his epigenetic eight-stage model of psychosocial development throughout the life cycle, building on Freud's theory of psychosexual development. This work, in particular, has stimulated the current generation of work on the adult stages of development [cf. Levinson et al. (1974, 1977), Gould (1972), Neugarten (1968), and Havighurst (1972) — popularized by Sheehy (1976)]. In Erikson's model (and in others as well) the stages are precipitated by the convergence of internal and environmental forces which require a new kind of adaptation from which one undertakes the development of new capacities and strengths. In

childhood, the internal forces emerge primarily from biological maturation (e.g., the sexual awakening at puberty), and even in later life, biological changes (acute illness, physical deterioration) may impose new adaptive responses. But for the most part, the inner forces for change in adults derive from psychological needs.

Environmental forces are similarly more predictable in the early years — mothers no longer tolerate giving constant attention to the post-infancy child; with increasing mobility of the two- to three-year-old, parents must put the brakes on at least the more destructive and intrusive behavior; and so on. In the adult stages the environmental forces vary more widely from one career path to another (career defined quite broadly to incorporate both occupational roles and other major walks of life, e.g., childbearing). Nonetheless, for the adult as for the child, significant external events (e.g., the birth of a first child, taking on new major work assignments, becoming responsible for aging parents, being blocked from long-dreamed-of achievements), whether planned or haphazard, produce changes in the environmental press to which one must adapt. In any case, the emerging centrality of new developmental tasks, marking entry to a new stage, is always a joint function of personal and situational factors. Research on adult development must also have this dual focus.

The Phases and Developmental Tasks of Adult Life. While there are minor disagreements among the authors mentioned above, a general model is emerging from their collective research efforts. The essential features of this model are:

1. Personality development throughout the life cycle occurs through a succession of relatively predictable phases.
2. Within each phase there is a cycle of intensity and quiescence — a disruption to the quasi-stationary equilibrium (in Lewin's terms) of one's former pattern of adaptation, leading to intense coping efforts and heightened activity (often involving significant changes in orientation and situational arrangements), followed by establishment of a new equilibrium.
3. The disequilibrium is generated, in each phase, by the emergence of a new focal conflict or dilemma created by new internal forces, environmental pressures and demands, or both.
4. One can cope with the focal conflict in defensive, or developmental ways (i.e., the consequences may be positive or negative, growthful or regressive).
5. Growth involves the active engagement in a set of "developmental tasks" appropriate to resolving the focal conflicts and satisfying personal needs and social responsibilities.

Havighurst (1977) defines a developmental task as one that "arises at or about a certain period in the life of the individual, successful achievement of which leads to his happiness and to success with later tasks, while failure leads to unhappiness in the individual, disapproval by the society, and difficulty with later tasks." He sees the young adult (20 to 35) as faced with two basic tasks: "He wants to explore possibilities, before making some permanent choices, especially about his occupational career. At the same

time he wants to get himself established in a life-structure which offers continuity and growth." The specific developmental tasks of this period are (1) selecting a mate, (2) starting a family, (3) rearing children, (4) managing a home, (5) getting started in an occupation, and (6) taking on civil responsibility. The major striving during this period (according to Neugarten, 1963) is toward establishing mastery over the outer world. Hence, one's orientation is largely other-directed, in keeping with his concerns about where and how he "fits" in society. Major preoccupations are achievement and recognition.

Toward the end of this period, many people begin to reexamine their purposes, drives, and life-style. They take stock of their accomplishments and resources and begin to question what they should do with the rest of their lives. That is to say, they enter the (often disconcerting) *midlife transition*.

In middle adulthood the frenetic turning inward of the midlife transition mellows to a more quiet preoccupation with the inner life, associated with an acceptance of the limited time left in life and with increased confidence in oneself and what one can do. The developmental tasks of middle adulthood, according to Havighurst, are (1) achieving mature social and civil responsibility, (2) assisting teenaged children to become responsible and happy adults, (3) reaching and maintaining satisfactory performance in one's occupational career, (4) developing adult leisure-time activities, (5) accepting and adjusting to the physiological changes of middle age, and (6) adapting to aging parents.

The life cycle thus can be conceived as spanning these broad phases: the formative years up to age

18 to 20, early adulthood to age 35 to 40, and middle-late adulthood. Each of these can be further subdivided for special purposes; in fact, many people experience a much larger number of phases as the conditions of their lives change. We distinguish these three because they typically involve quite different stances toward life, each with its special developmental dissection. In childhood and adolescence, the focus is on *acquisition* of those interests, values, propensities, and competencies that make one a unique person ready to live in the adult world.

The next 15 to 20 years or so constitute a period of differentiation and specialization during which the person finds his place in that world and learns how to function more or less effectively within it. Generally, during this period one's focus is outward, attending to environmental possibilties and constraints and what one needs to do to adapt to and master living in one's life structure (the pattern of roles, groups, and organizations which we have included under the umbrella term circumstances).

Sometime in midlife there tends to be a (not always deliberate or articulated) questioning and reexamination of one's life and turning inward of focus aimed toward a more effective and comfortable *integration* of the whole self and life circumstances. There is, of course, nothing magical about age per se; the shift from one phase to another, while fairly predictable, varies considerably from person to person, depending both on her/his psychological condition and on how s/he is viewed and treated by others.

We think it is also important to differentiate life phases from developmental stage or level. The phases Sheehy identifies, for example, reflect age-related

conditions and challenges of life. Developmental tasks are set before one. These may or may not be faced and worked through in developmental ways. Consequently, personal growth or increased maturity may or may not accrue from them. Growth in terms of enhancement of self-insight, wisdom, competence, ego strength, adaptability, or personal integrity (while perhaps correlated with the movement through life phases) clearly reflects a different conceptual dimension. Changing circumstances and adjustments to them do not automatically imply personality development, although they often provide the conditions and stimulus for growth to occur.

Changing Life Structures. The transition from one life phase to another is often marked by some significant circumstantial change (e.g., marriage, divorce, moving to a new community, taking a new job) or internal changes in meanings, attitude, or purpose, calling for a rearrangement of one's relationship to the structures in his/her environment. Levinson refers to such changes as "marker events."

Much about one's circumstances is influenced by forces outside oneself. Some changes (e.g., death of a loved one) are imposed upon the person — s/he is a victim of her/his circumstances. S/he has no choice. Nevertheless, people generally have a great deal of choice in life structure. Even in situations totally defined and structured by others, it is the person, more often than not, who chooses whether to involve himself/herself in that situation.

To a considerable extent, once in a situation, much can be done to alter one's environment — to restructure conditions and relationships in ways that make them more fitting and fulfilling for the person. For

example, a manager may not have full choice in what responsibilities fall within his/her purview or which subordinates will be assigned to his/her area, but s/he often has considerable latitude in determining how tasks will be approached and in style of management (e.g., participative, or group-centered vs. unilateral or one-on-one supervision). Similarly, family members can often renegotiate responsibilities for various household tasks.

In these terms, adaptation is a two-way street; one can alter the situation to fit himself/herself as well as adjusting herself/himself to fit the situation. One is active agent as well as sometimes pawn in the flux of changing life structures. Choice in entering, altering, and leaving various environmental structures is ultimately what gives one at least some mastery over circumstances. A consequence of this is that, just as people can create or find living arrangements that give some modicum of comfort, security, and gratification, they can seek out and build new life structures that provide conditions and experiences for further personal development.

Learning as the Core Process of Development. Movement through life's phases may occur with dramatic or only minor changes in circumstantial structure. Similarly, it may coincide with substantial or with little or no personal growth and development. One may adapt to new circumstances or new life demands in old ways and, in spite of modification in behavior, remain essentially unchanged by the experience. Yet the changing pressures, conditions, and opportunities are often the ground for new spurts in personal growth.

The difference between mere readjustment and de-

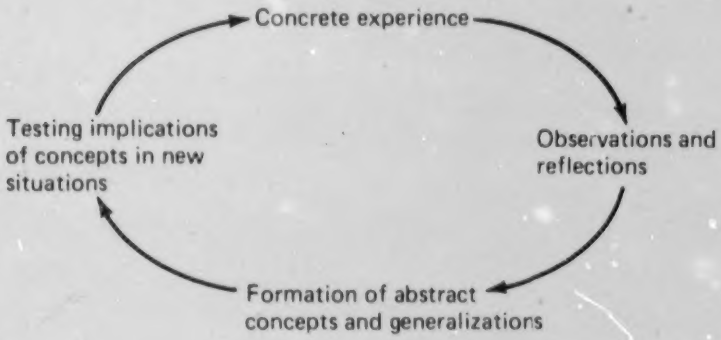
velopment is a function of the learning that occurs through the experience. Personal development involves increasing self-insight and recognition and acceptance of one's complex, ever-changing dynamics. It also involves increased understanding of one's world and how it works. It involves increased capacity for taking responsibility for oneself, coupled with increased competence in pursuing one's ends in personally fulfilling and socially beneficial ways. All of these increases come about through a variety of learning processes — processes that can occur in any setting and continue throughout one's life.

The Theory of Experiential Learning

Experiential learning theory provides a model of learning and adaptation processes consistent with the structure of human cognition and the stages of human growth and development. It conceptualizes the learning process in such a way that differences in individual learning styles and corresponding learning environments can be identified. The core of the model, shown in Figure 1, is a simple description

FIGURE 1

The Experiential Learning Model


Concrete experience
Observations and reflections
Formation of abstract concepts and generalizations
Testing implications of concepts in new situations

of the learning cycle; of how experience is translated into concepts which, in turn, are used as guides in the choice of new experiences.

Learning is conceived of as a four-stage cycle. Immediate concrete experience is the basis for observation and reflection. These observations are assimilated into a "theory" from which new implications for action can be deduced. These implications or hypotheses then serve as guides in acting to create new experiences. The learner, if s/he is to be effective, needs four different kinds of generic adaptive abilities: *concrete experience* abilities (CE), *reflective observation* (RO) abilities, *abstract conceptualization* (AC) abilities, and *active experimentation* (AE) abilities. That is s/he must be able to involve herself/himself fully, openly, and without bias in new experiences (CE); s/he must be able to observe and reflect on these experiences from many perspectives (RO); s/he must be able to create concepts that integrate her/his observations into logically sound theories (AC); and s/he must be able to use these theories to make decisions and solve problems (AE). Yet this ideal is difficult to achieve. Can anyone become highly skilled in all these abilities, or are they necessarily in conflict? How can one be concrete and immediate and still be theoretical?

A closer examination of the four-stage learning model would suggest that learning requires abilities that are polar opposites and that the learner, as a result, must continually choose which set of learning abilities s/he will bring to bear in a specific learning situation. More specifically, there are two primary dimensions to the learning process. The first dimension represents the concrete experiencing of

events at one end and abstract conceptualization at the other. The other dimension has active experimentation at one extreme and reflective observation at the other. Thus, in the process of learning, one moves in varying degrees from actor to observer, from specific involvement to general analytic detachment.

These two dimensions represent the major direction of cognitive development identified by Piaget. In his view, the course of individual cognitive development from birth to adolescence moves from a phenomenolistic (concrete) view of the world to a constructivist (abstract) view and from an egocentric (active) view to a reflective internalized mode of knowing. Piaget also maintains that these have also been the major directions of development in scientific knowledge (Piaget, 1970).

Many other cognitive psychologists (e.g., Bruner, 1960, 1966; Harvey, Hunt, and Shroeder, 1961) have identified the concrete/abstract dimensions as a primary dimension on which cognitive growth and learning occurs. Goldstein and Scheerer suggest that greater abstractness results in the development of the following abilities:

1. To detach one's ego from the outer world or from inner experience.
2. To assume a mental set.
3. To account for acts to oneself; to verbalize the account.
4. To shift reflectively from one aspect of the situation to another.
5. To hold in mind simultaneously various aspects.
6. To grasp the essential of a given whole: to break up a given into parts to isolate and to

synthesize them.

7. To abstract common properties reflectively; to form hierarchic concepts.
8. To plan ahead ideationally, to assume an attitude toward the more possible, and to think or perform symbolically (1941, p. 4).

Concreteness, on the other hand, represents, according to these theorists, the absence of these abilities, the immersion in and domination by one's immediate experiences. Yet the circular, dialectic model of the learning process would imply that abstractness is not exclusively good and concreteness exclusively bad. Witkin's (1962, 1973) extensive research on the related cognitive styles of global vs. analytic functioning has shown that both extremes of functioning have their costs and benefits; the analytic style includes competence in analytical functioning combined with an impersonal orientation, while the global style reflects less competence in analytic functioning combined with greater social orientation and social skill. Similarly, when we consider the highest form of learning — creativity — we see a requirement that one be able to experience anew, freed somewhat from the constraints of previous abstract concepts. In psychoanalytic theory this need for a concrete childlike perspective in the creative process is referred to as regression in service of the ego (Kris, 1952). Bruner (1966), in his essay on the conditions for creativity, emphasizes the dialectic tension between abstract and concrete involvement. For him the creative act is a project of detachment and commitment, of passion and decorum, and of a freedom to be dominated by the object of one's inquiry.

The active/reflective dimension is the other major dimension of cognitive growth and learning. As growth occurs, thought becomes more reflective and internalized, based more on the manipulation of symbols and images than overt actions. The modes of active experimentation and reflection, like abstractness/concreteness, stand in opposition to one another. Kagan's (Kagan and Kogan, 1970) research on the cognitive-style dimension of reflection-impulsivity suggests that extremes of functioning on this continuum represent opposing definitions of competence and strategies for achieving. The impulsive strategy is based on seeking reward for active accomplishment, while the reflective strategy is based on seeking reward through the avoidance of error. Reflection tends to inhibit action, and vice versa. For example, Singer (1968) has found that children who have active internal fantasy lives are more capable of inhibiting action for long periods of time than are children with little internal fantasy life. Kagan et al. (1964) have found, on the other hand, that very active orientations toward learning situations inhibit reflection and thereby preclude the development of analytic concepts. Herein lies the second major dialectic in the learning process—the tension between actively testing the implications of one's hypotheses and reflectively interpreting data already collected.

Individual Learning Styles. Over time, accentuation forces operate on individuals in such a way that the dialectic tensions between these dimensions are consistently resolved in a characteristic fashion. As a result of our hereditary equipment, our particular past life experience, and the demands of our present

environment, most people develop learning styles that emphasize some learning abilities over others. Through socialization experiences in family, school, and work, we come to resolve the conflicts between being active and reflective and between being immediate and analytical in characteristic ways. Some people develop minds that excel at assimilating disparate facts into coherent theories, yet these same people are incapable of, or uninterested in, deducing hypotheses from the theory. Others are logical geniuses but find it impossible to involve and surrender themselves to an experience. And so on. A mathematician may come to place great emphasis on abstract concepts, while a poet may value concrete experience more highly. A manager may be primarily concerned with the active application of ideas, while a naturalist may develop his/her observational skills highly. Each of us in a unique way develops a learning style that has some weak and strong points.

We have developed a brief self-descriptive inventory called the Learning Style Inventory (LSI) to measure differences in learning styles along the two basic dimensions of abstract/concrete and action/reflection (Kolb, 1976). While the individuals tested on the LSI show many different patterns of scores, we have identified four statistically prevalent types of learning styles. We have called these four styles the converger, the diverger, the assimilator, and the accommodator. The following is a summary of the characteristics of these types based both on our research and on clinical observation of these patterns of LSI scores.

The *converger's* dominant learning abilities are abstract conceptualization (AC) and active experi-

mentation (AE). His/her greatest strength lies in the practical application of ideas. We have called this learning style the "converger" because a person with this style seems to do best in those situations, such as conventional intelligence tests, where there is a single correct answer or solution to a question or problem (Torrealba, 1972). His/her knowledge is organized in such a way that, through hypothetical-deductive reasoning, s/he can focus it on specific problems. Liam Hudson's (1966) research in this style of learning (using different measures than the LSI) shows that convergers are relatively unemotional, preferring to deal with things rather than people. They tend to have narrow interests, and often choose to specialize in the physical sciences. Our research shows that this learning style is characteristic of many engineers (Kolb, 1976).

The *diverger* has the opposite learning strengths of the converger. S/he is best at concrete experience (CE) and reflective observation (RO). His/her greatest strength lies in his/her imaginative ability. S/he excels in the ability to view concrete situations from many perspectives and to organize many relationships into a meaningful "gestalt." We have labeled this style "diverger" because a person of this type performs better in situations that call for the generation of ideas, such as in a "brainstorming" idea session. Divergers are interested in people and tend to be imaginative and emotional. They have broad cultural interests and tend to specialize in the arts. Our research shows that this style is characteristic of persons with humanities and liberal arts backgrounds. Counselors, organization development consultants, and personnel managers often have this learning style.

The *assimilator*'s dominant learning abilities are abstract conceptualization (AC) and reflective observation (RO). His/her greatest strength lies in his/her ability to create theoretical models. S/he excels in inductive reasoning; in assimilating disparate observations into an integrated explanation (Grochow, 1973). S/he, like the converger, is less interested in people and more concerned about abstract concepts, but s/he is less concerned with the practical use of theories. For him/her it is more important that the theory be logically sound and precise. As a result, this learning style is more characteristic of the basic sciences and mathematics rather than the applied sciences. In organizations, this learning style is found most often in the research and planning departments (Kolb, 1976; Strasmore, 1973).

The *accommodator* has the opposite strengths of the assimilator. S/he is best at concrete experience (CE) and active experimentation (AE). His/her greatest strength lies in doing things; in carrying out plans and experiments and involving himself/herself in new experiences. S/he tends to be more of a risk taker than people with the other three learning styles. We have labeled this style "accommodator" because s/he tends to excel in those situations where s/he must adapt himself/herself to specific immediate circumstances. In situations where the theory or plans do not fit the facts, s/he will most likely discard the plan or theory. (The opposite type, the assimilator, would be more likely to disregard or reexamine the facts.) S/he tends to solve problems in an intuitive, trial-and-error manner (Grochow, 1973), relying heavily on other people for information rather than her/his own analytic ability (Stabell, 1973). The accommodator is at ease with people but is some-

times seen as impatient and "pushy." His/her educational background is often in technical or practical fields such as business. In organizations, people with this learning style are found in "action-oriented" jobs, often in marketing or sales.

Developmental Stages: An Experiential Learning Perspective. In addition to providing a framework for conceptualizing individual differences in style of adaptation to the world, the experiential learning model suggests more normative directions for human growth and development. As we have seen in the previous section, individual learning styles affect how people learn, not only in the limited educational sense, but also in the broader aspects of adaptation to life, such as decision making, problem solving, and life-style in general. Experiential learning is not a molecular educational concept, but a molar concept describing the central process of human adaptation to the social and physical environment. It, like Jungian theory (Jung, 1923), is a holistic concept that seeks to describe the emergence of basic life orientations as a function of dialectic tensions between basic modes of relating to the world. As such, it encompasses other more limited adaptive concepts, such as creativity, problem solving, decision making, and attitude change, that focus heavily on one or another of the basic aspects of adaptation. Thus, creativity research has tended to focus on the divergent (concrete and reflective) factors in adaptation, such as tolerance for ambiguity, metaphorical thinking and flexibility, while research on decision making has emphasized more convergent (abstract and active) adaptive factors, such as the rational evaluation of solution alternatives.

From this broader perspective, learning becomes a central life task, and how one learns becomes a major determinant of the course of his/her personal development. The experiential learning model provides a means of mapping these different developmental paths and a normative adaptive ideal — a learning process wherein the individual has highly developed abilities to experience, observe, conceptualize, and experiment.

The human growth process is divided into three broad developmental stages. The first stage, *acquisition*, extends from birth to adolescence and marks the acquisition of basic learning abilities and cognitive structures. The second stage, *specialization*, extends through formal education and/or career training and the early experiences of adulthood in work and personal life. In this stage, development primarily follows paths that accentuate a particular learning style. Individuals shaped by social, educational, and organizational socialization forces develop increased competence in a specialized mode of adaptation that enables them to master the particular life tasks they encounter in their chosen career (in the broadest sense of that word). This stage, in our thinking, terminates at midcareer, although the specific chronology of the transition to stage 3 will vary widely from person to person and from one career path to another. The third stage, *integration*, is marked by the reassertion and expression of the nondominant adaptive modes or learning styles. Means of adapting to the world that have been suppressed in favor of the development of the more highly rewarded dominant learning style now find expression in the form of new career interests, changes in life-styles, and/or innovation and creativity in

one's chosen career.

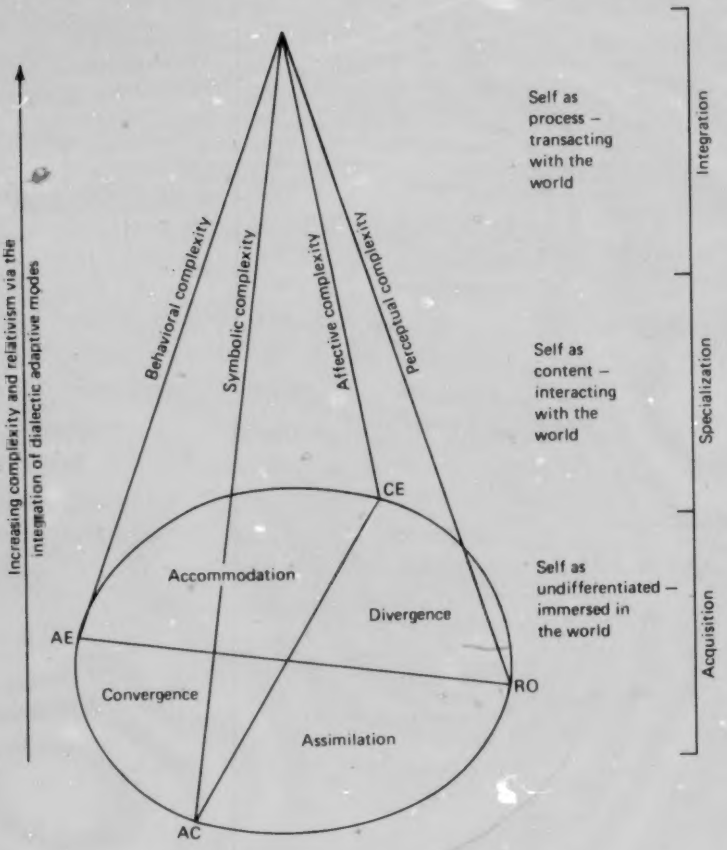
Through these three stages, development is marked by increasing complexity and relativism in dealing with the world and one's experiences, and by higher-level integrations of the dialectic conflicts between the four primary genotypic adaptive modes -- concrete experience, reflective observation, abstract conceptualization, and active experimentation. With each of these four modes, a major dimension of personal growth is associated. Development in the concrete experience adaptive mode is characterized by increases in *affective complexity*. Development in the reflective observation mode is characterized by increases in *perceptual complexity*. Development in the abstract conceptualization and active experimentation modes are characterized by increases in *symbolic complexity* and *behavioral complexity*, respectively.

In the early stages of development, progress along one of these four dimensions can occur with relative independence from the others. The child and young adult, for example, can develop highly sophisticated symbolic proficiencies and remain naive emotionally. At the highest stages of development, however, the adaptive commitment to learning and creativity produces a strong need for integration of the four adaptive modes. Development in one mode precipitates development in the others. Increases in symbolic complexity, for example, redefine and sharpen both perceptual and behavioral possibilities. Thus, complexity and the integration of dialectic conflicts among the adaptive modes are the hallmarks of true creativity and growth.

Figure 2 graphically illustrates the experiential learning model of growth and development as it has

FIGURE 2

The Experiential Learning Theory of Growth and Development



been outlined thus far. The four dimensions of growth are depicted in the shape of a cone, the base of which represents the lower stages of development and the apex of which represents the peak of development — representing the fact that the four dimensions become more highly integrated at higher stages of development. Any individual learning style would be represented on this cone by four data points on the four vertical dimensions of development. Thus, a converger in developmental stage 2 (specialization) would be characterized by high complexity in the symbolic and behavioral modes and lower complexity in the affective and perceptual modes. As s/he moved into stage 3 of development, her/his complexity scores in the affective and perceptual modes would increase.

While we have depicted the stages of the growth process in the form of a simple three-layer cone, the actual process of growth in any single individual life history probably proceeds through successive oscillations from one stage to another. Thus, a person may move from stage 2 to 3 in several separate subphases of integrative advances followed by consolidation or regression into specialization. (For a more detailed description of this development model, see Kolb and Fry, 1975.)

Learning Press of Disciplines and Careers

Situations differ in the adaptational demands they place on the person in two major ways. First, they differ in degree of complexity: some situations are simple, familiar, predictable, and consequently easy to understand and deal with, while others are complex, turbulent, and highly taxing of one's coping resources.

Second, they differ in the kinds of adaptive responses that tend to be effective. For example, many interpersonal situations call for a heightened sensitivity to emotional dynamics and nuances. Active listening and tuning in to others through skills in concrete experiencing is more effective than, for example, withdrawing into reflection or catagorizing others in abstract terms. Other problems are more readily dealt with through creation and application of abstract analytic schemes. Consequently, it is important in examining career possibilities to differentiate the kind as well as the degree of complexity within which one must function.

The concept of environmental learning press is based on differential complexity inherent in the situation — on the kind of learning process that facilitates adaptation. But learning press implies more than that. It also reflects the fact that practice in dealing with a particular kind of complexity stretches the person's capacity for dealing with it more readily. A situation that demands experimenting with behavioral alternatives enhances and reinforces active experimentation, to the extent that the person engages in this process. One expands his/her learning and adaptive processes through exercising them. Hence, a particular environment may be a fertile field for enriching one or another generic adaptive competence. Thus, given an appropriate methodology, environments can be assessed for the extent to which they require and thereby stimulate development on each of the four basic learning modalities.

We do not mean to imply that a press toward a particular style of learning necessarily results in that

kind of learning. Just as one acquires through childhood and adolescence some capacity to engage in learning modes, one also acquires a variety of ways of coping with overwhelming or intolerable complexity. Complex situations can be defended against as well as engaged in. Among the ways one can deal defensively with complex situations are selective inattention, polarizing (black-white thinking), stereotyping, intellectualizing, withdrawing, impulsive action, and routinization.

A mismatch of style and press is more apt to lead to a defensive response and to an artificial simplification of situational complexity. Divergers are apt to turn aside the challenge and tedium of abstract analysis in favor of pursuing new excitements, or to resist and delay making the decisions required for taking action when that is called for. Convergers, on the other hand, are apt to ignore or stereotype others in favor of applying abstract principles to problem solving. The former often defends against symbolic and behavioral complexity, while the latter defends against the affective and perceptual. Accommodators and assimilators likewise have their ways of reducing and defending against kinds of complexity with which they are ill-equipped to deal.

Differential Learning Press Across Academic Disciplines. Let us turn now to the question of whether different fields involve characteristic kinds of complexity and therefore press toward particular adaptive competencies. More particularly, we are concerned with whether the two-dimensional learning style grid might accurately portray the similarities, differences, and interrelations among fields. To explore this question, we examined data collected in

the 1969 Carnegie Commission on Higher Education study of representative American colleges and universities. These data consisted of 32,963 questionnaires from graduate students in 158 institutions and 60,028 questionnaires from faculty in 303 institutions. Using tabulations of these data reported in Feldman (1974), *ad hoc* indices were created of the abstract/concrete and active/reflective dimensions for the 45 academic fields identified in the study. The abstract/concrete index was based on graduate-student responses to two questions asking how important an undergraduate background in mathematics and humanities was for their fields. The mathematics and humanities questions were highly negatively correlated (-.78). The index was computed using the percentage of graduate-student respondents who strongly agreed that either humanities or mathematics was very important:

$$\frac{\%\ \text{math important} + (100 - \%\ \text{humanities important})}{2}$$

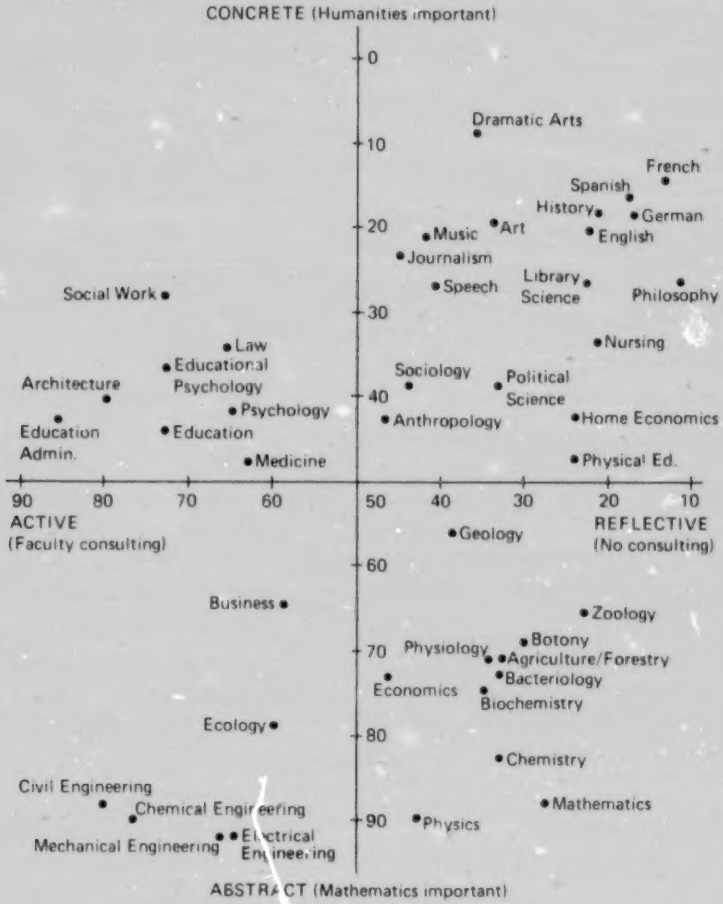
Thus high index scores indicated a field where a mathematics background was important and humanities was not important.

The active/reflective index used faculty data on the percent of faculty in a given field who were engaged in paid consultation to business, government, and so on. This seemed to be the best indicator on the questionnaire of the active, applied orientation of the field. As Feldman observed, "Consulting may be looked upon not only as a source of added income but also as an indirect measure of the 'power' of a discipline, that is, as a chance to exert the influence

and knowledge of a discipline outside the academic setting" (1974, p. 52). The groupings of academic fields based on these indices are shown in Figure 3.

FIGURE 3

Concrete/Abstract and Active/Reflective Orientations of Academic Fields Derived from the Carnegie Commission Study of American Colleges and Universities



The indices produce a pattern of relationships among academic fields that is highly consistent with other studies (see Biglan, 1973) and with the learning style data (reported in a later section). The results support the widely shared view that cultural variations in academic fields divide the academic community into two camps, the scientific and the artistic (e.g., Snow, 1963; Hudson, 1966). They also suggest that this is usefully enriched by the addition of a second dimension of action/reflection or applied/basic. When academic fields are mapped on this two-dimensional space, a fourfold typology of disciplines emerges. The *natural sciences and mathematics*, calling for assimilative adaptive skills, are appropriately clustered in the abstract/reflective quadrant, while the abstract/active quadrant incorporates the *science-based professions*, most notably the engineering fields, reflecting their requirements for skills in convergence around applied problems. The *social professions* (such as education, social work, and law) press for accommodative competencies and are found in the concrete/active quadrant. The concrete/reflective quadrant encompasses the *arts, humanities, and social sciences*, all of which tend to be enriched by divergent mentalities.

Some fields seem to include within their boundaries considerable variation on these two dimensions of learning style. Several of the professions (particularly management, medicine, and architecture) are themselves multidisciplinary, including specialities that emphasize different learning styles. Medicine requires both a concern for human service and scientific knowledge. Architecture has requirements for artistic and engineering excellence. Management involves skill at both quantitative and qual-

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itative analysis: dealing with things and dealing with people. Several of the social sciences, particularly psychology, sociology, and economics, can vary greatly in their basic inquiry paradigm. Clinical psychology emphasizes divergent learning skills, while experimental psychology emphasizes convergent skills; industrial and educational psychology emphasize practical accommodative skills. Sociology can be highly abstract and theoretical (as in Parsonian structural functionalism) or concrete and active (as in phenomenology or ethnomethodology). Some economics departments may be very convergent, emphasizing the use of econometric models in public policy, while others are divergent, emphasizing economic history and philosophy.

Indeed, every field will show variation on these dimensions within a given department, between departments, from undergraduate to graduate levels, and so on. The purpose of this analysis is not to "pigeonhole" fields but to identify useful dimensions for describing variations in the learning/inquiry process that characterize different career paths.

The Structure of Knowledge

When one examines fields in the four major groupings we have identified — the social professions, the science-based professions, humanities/social science, and natural science/mathematics — it becomes apparent that what constitutes valid knowledge in these four groupings differs widely. This is easily observed in differences in how knowledge is reported (e.g., numerical or logical symbols, words, or images), in inquiry methods (e.g., case studies, experiments, logical analysis), or in criteria for evaluation (e.g., practical vs. statistical significance). In

this typology the professions are predominantly discrete in their inquiry strategy, seeking to understand particular events or phenomena, while the basic disciplines are integrated in their inquiry strategies, seeking structures or processes that apply universally. The scientific professions and basic disciplines are predominantly analytic, seeking to understand wholes by identifying their component parts, while the social/humanistic fields tend to be synthetic, believing that the whole can never be explained solely by its component parts.

Learning Press in Professional Education. The data presented above deal with learning press as a generalized direction of a field — the dominant "style" of the field, analogous to the learning style of a person. But if we are to understand how learning press reinforces and enhances development of adaptive competencies, we must take a more microscopic look. What are the specific conditions, events, and social psychological processes through which the environmental press impacts the person?

In educational settings, a major focal point for learning press is the immediate learning environment, determined primarily by teachers and the course designs. For example, we have found correlations between the learning styles of students and the learning styles of teachers they found influential, as well as correlations between student learning styles and preference for educational methods, such as lectures, small-group discussions, and so on (Kolb, 1976). Fry (1977) has developed a reliable assessment procedure for determining the extent to which a given learning environment stimulates development on the four basic learning style

modes: affective complexity, perceptual complexity, symbolic complexity, and behavioral complexity. His technique examines five areas of a learning environment: (1) objectives, (2) principal focus and source of information, (3) nature of feedback and rewards, (4) the learner's role, and (5) the teacher's role.

Table 1 identifies characteristics of the four "pure" types of learning environments. In each case, prac-

TABLE 1

Characteristics of Educational Environment Which Press Toward and Reinforce Basic Learning Modes

1. Affectively complex environments are characterized by:
   a. Focus on here-and-now experiences.
   b. Legitimization of expression of feelings and emotions.
   c. Situations structured to allow ambiguity.
   d. High degree of personalization.
2. Perceptually complex environments are characterized by:
   a. Opportunities to view subject matter from different perspectives.
   b. Time to reflect and roles (e.g., listener, observer) that allow reflection.
   c. Complexity and multiplicity of observational frameworks.
3. Symbolically complex environments are characterized by:
   a. Emphasis on recall of concepts.
   b. Thinking or acting governed by rules of logic and inference.
   c. Situations structured to maximize certainty.
   d. Authorities respected as caretakers of knowledge.
4. Behaviorally complex environments are characterized by:
   a. Responsibility for setting own learning goals.
   b. Opportunities for real risk taking.
   c. Environmental responses contingent upon self-initiated action.

tice in and reinforcement of the associated learning mode is required and supported. Formal lectures, textbook reading, and test taking exemplify symbolically complex situations intended to expand one's capacity for abstract conceptionalization. Most graduate seminars and paper writing assignments are both perceptually and symbolically complex,

reinforcing reflective as well as conceptualizing skills. On the other hand, field placements in social work or clinical fields involve both concrete experiencing and active experimenting, stretching one's competence in dealing with affective and behavioral complexity.

From Fry's analysis it becomes clear that enhancement of those generic adaptive competencies most relevant to a particular career field is a function not just of *what* is learned, but also of *how* it is learned and under what immediate conditions in the educational context. Pedagogical strategies and teaching styles can be congruent or incongruent not only with the subject matter, but also with the adaptive competencies required for success in the field. Initial socialization into a career field occurs perhaps most forcefully through these processes.

The Learning Press of Work Roles and Environments. Adaptation and learning are called for in every context throughout life. In most work settings, one is interdependent with a variety of others who have a stake in how the assigned role is performed. These others (colleagues, clients, supervisors, subordinates, and others with whom s/he interacts) each hold expectations about what s/he should and should not do, how problems should be handled, and how relationships should be maintained. In some fields the issues are restricted to task behaviors, but in many the expectations go beyond this to what one should believe and how one should think and feel.

When these role expectations are communicated, through word or action, they become *role pressures*. They are most apt to be expressed, of course, when one's behavior violates expectations or when other

conditions call for a change in behavior. It is through these sometimes distinct, but often subtle and indirect pressures that one learns, day-by-day, how to be in his/her career.

Four functions are involved in virtually every endeavor: perceiving, thinking, acting, and feeling, and any of these may be the target of role expectations. Consequently, we think of expectations being in the perceptual domain if they deal with what the person becomes aware of, recognizes, and attends to. At the group or organizational level, this has to do with a shared sense of reality. In highly stable situations where simple, routine tasks are to be performed, a common sense of reality is readily maintained with little active communication of role expectations. Turbulent situations or those which require simultaneous attention to many facets and issues are more apt to involve role pressures having to do with the person's awareness or observational capacities. Thus, we can assess roles (and career lines) in terms of their relative perceptual complexity.

Roles that involve complex analysis, synthesis, and problem solving tend to be rich in symbolic complexity. People in such roles (e.g., researchers, educators) tend to be evaluated in terms of the depth and quality of their thought processes and their ability to integrate complex issues through abstract reasoning. Role pressures on this dimension tend to deal with logic, comprehensiveness, keeping abreast of knowledge development, potential applications, and the like.

In other fields the emphasis is on action — on decision making and generating useful results. Man-

agers, engineers, physicians, nurses, and many trades deal with high degrees of behavioral complexity. Role pressures tend to focus on the quality of decisions taken and solutions achieved. How one deals with the facts in the situation to produce valued outcomes is the major concern of role senders.

Affective complexity is central to certain roles (e.g., psychiatrist, personnel manager, social worker, minister, actor) and is generally highly valued in the humanities and arts. Role pressures in the affective domain are apt to focus on having an appropriate value system and using it with empathy and understanding.

At any given time, whatever one's career, one may be subjected to role pressures in any of these domains — perceptual, symbolic, behavioral, or affective — but clearly those roles which center on one or another tend to reinforce specialization in a corresponding learning style. Early in one's career the press is often specialized, only to be broadened in later phases. For example, engineers generally experience the strongest role press in the symbolic and behavioral domains, but with advancement to management positions, there is increasing pressure to attend also to the affective and perceptual. Thus, changing roles may generate conflict for the person, but may also be the stimulus for increased integration.

Role Constellations and Life-Styles. Most of us occupy several roles during any given phase of life. That is, one is not only a butcher but also a parent/spouse, a neighbor, a member of the committee on social problems at church, a volunteer fireman, and an umpire for the Little League. Each of these

roles involves relationships and expectations. Each holds its potential for learning, fulfillment, and stress. They may all contribute to specialization in learning and adaptive style or toward complementarity of different styles.

Role constellations vary along several dimensions that may have important consequences for adult development. They range from simple to complex, depending on the number of separate roles and contexts one engages in. They vary in the extent to which one role dominates the others (e.g., for many housewives, being a mother is central at all times and colors engagement in every other role). They vary in unity vs. disjointedness: some people manage to keep their various roles and role relationships quite isolated from one another — working in the city with one set of colleagues but never taking work or colleagues to their homes in the suburbs.

The pattern of one's role constellation may yield a unified sense of self; that is, one carries the same identity, interests, and adaptive style into all roles. It is equally possible, depending on the constellation, for one to be a "different person" in each role (e.g., to be strong and domineering at work, passive and dependent at home, aloof in community relations, and a "tiger" with a hidden lover). One's life-style, in this sense, may promote learning and stretching one's capacities in some areas while retarding development in others. It may contribute to specialization as well as balancing toward integration.

Career Choice and Specialization in Early Adulthood

The transition from adolescence to early adulthood involves a great many changes in one's life struc-

ture. The provisional selection of a career and one's first job as an adult are marker events in the resolution of adolescent identity confusion. Entering the adult world begins the elaboration and confirmation of one's newly formed identity. This involves the actualization of one's personal dreams of adult accomplishment, entering a career that holds promise of implementing those dreams, and arranging a new life structure that supports adult-adult relationships, personal fulfillment, and opportunity for the future. Interpersonal issues take on new significance as the person works through the departure from family of origin toward independent life and reaches toward intimacy in selecting a mate and starting a family.

During this early adult transition, one is torn between the need to make career and marital choices which will establish structure, direction, and stability and the desire to keep open the options and possibilities for further development. For some, college offers an extended opportunity to explore various fields, try out relationships with potential partners, and get to know themselves better before making the critical and seemingly irreversible life decisions. In any event, one strives to make choices that yield a good match between personal aspirations and dispositions, on the one hand, and environmental demands, opportunities and resources, on the other. One seeks not just any niche in the adult world, but one that fits oneself and one's adaptive style.

In the experiential learning theory of career development, stability and change in career paths is seen as resulting from the interaction between internal personality dynamics and external social forces in a manner much like that described by

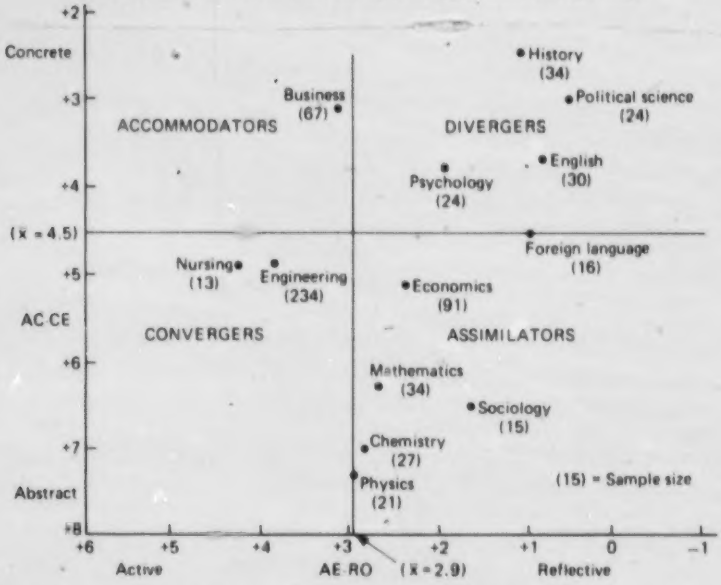
Super and co-workers (1963). The most powerful development dynamic that emerges from this interaction is the tendency for there to be a closer and closer match between self characteristics and environmental demands. This match comes about in two ways: (1) environments tend to change personal characteristics to fit them (i.e., socialization), and (2) individuals tend to select themselves into environments that are consistent with their personal characteristics. Thus, career development in general tends to follow a path toward accentuation of personal characteristics and skills (Feldman and Newcombe, 1969; Kolb, 1973), in that development is a product of the interaction between choices and socialization experiences that match these dispositions, and the resulting experiences further reinforce the same choice disposition for later experience. Many adult life paths follow a cycle of job, education, and life-style choices that build upon the experiences resulting from similar previous choices. Indeed, the common stereotype of the successful career is a graded ladder of similar experiences on which one climbs to success and fulfillment.

Learning Styles and Career Choice. To illustrate this process, let us first examine the relationship between individuals' learning styles and their career choice. If we examine the undergraduate major of the individuals in a sample of 800 practicing managers and graduate students in management, a correspondence can be seen between their Learning Style Inventory (LSI) scores and their initial career interests (Kolb, 1976). This is done by plotting the average LSI scores for managers in the sample who reported their undergraduate college major (see

Figure 4); only those majors with more than 10 people responding are included.

FIGURE 4

Average LSI Scores on Active/Reflective (AE-RO) and Abstract/Concrete (AC-CE) by Undergraduate College Major



The distribution of undergraduate majors on the learning style grid is quite consistent with theory. Undergraduate business majors tend to have accommodative learning styles, while engineers on the average fall in the convergent quadrant. History, English, political science, and psychology majors all have divergent learning styles. Mathematics and chemistry majors have assimilative learning styles along with economics and sociology. Physics majors are very abstract, falling between convergent and assimilative quadrant. Subsequent studies have consistently replicated this basic pattern of relationship

between undergraduate majors and learning styles (Kolb, 1976), a pattern that directly corresponds to the typology of career fields presented earlier (see Figure 3). What these studies show is that undergraduate education is a major factor in the development of learning style. Whether this is because individuals are shaped by the fields they enter or because of selection/evaluation processes that put people into and out of disciplines is an open question at this point. Most probably both factors are operating — people choose fields that are consistent with their learning styles and are further shaped to fit the learning norms of their field once they are in it. When there is a mismatch between the field's learning norms and the individual's learning style, people will either change or leave the field.

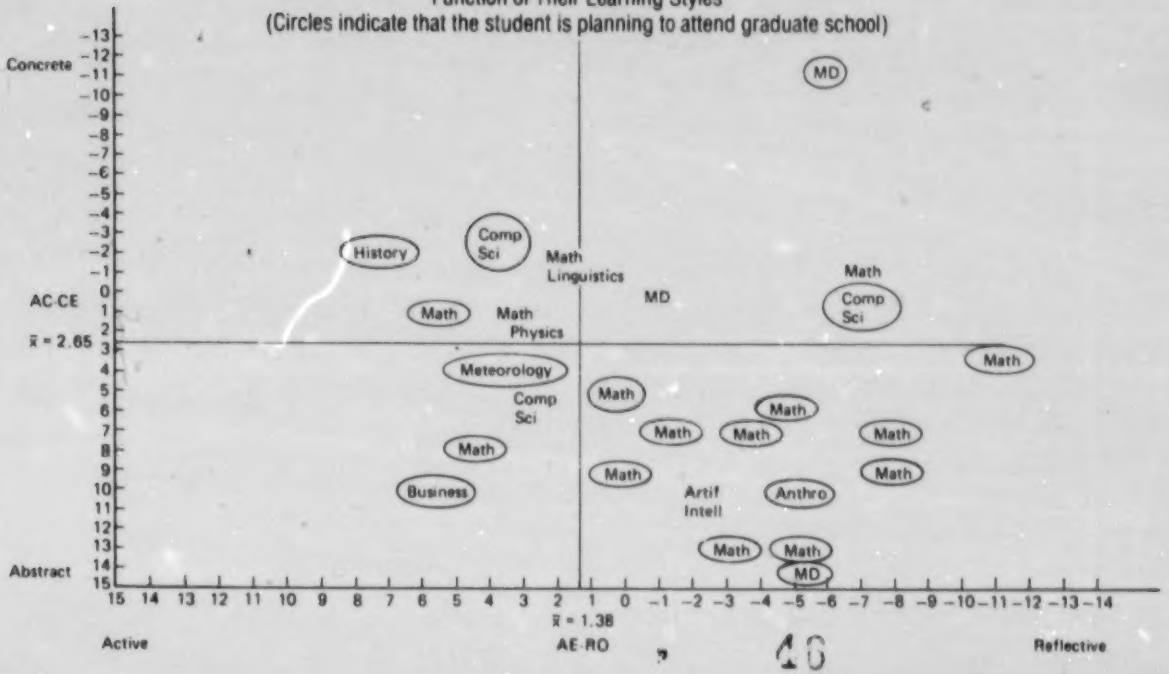
Although the data above are suggestive of some general correspondence between learning styles and careers, they do not offer evidence for the accentuation process. In a first attempt to examine the details of this process, Plovnick (1975) studied a major university department using the concepts of convergence and divergence defined by Hudson (1966). He concluded that the major emphasis in physics education was on convergent learning. He predicted that physics students who had divergent learning styles would be more uncertain of physics as a career and would take more courses outside the physics department than their convergent colleagues. His predictions were confirmed. Those students who were not fitted for the convergent learning style required in physics tended to turn away from physics as a profession, while those physics students having a convergent style continued to specialize in physics, both in their course choice and their career choices.

In another study of MIT seniors (Kolb, 1973), we further examined the consequences of matches and mismatches between student learning style and discipline demands. Several criteria were used to choose four departments whose learning style demands matched the four dominant learning styles. To study the career choices of the students in the four departments, each student's LSI scores were used to position him/her in the LSI grid with a notation of the career field s/he had chosen to pursue after graduation. If the student was planning to attend graduate school, his/her career field was circled. If the accentuation process were operating in the career choices of the students, we should find that those students who fall in the same quadrant as the norm of their academic major should be more likely to pursue graduate training and careers related to that major; while students with learning styles that differ from their discipline norms should be more inclined to pursue other careers and not attend graduate school in their discipline. We can illustrate this pattern by examining students in the mathematics department (Figure 5). Ten of the 13 mathematics students (77 percent) whose learning styles were congruent with departmental norms choose careers and graduate training in mathematics. Only two of the 13 students (15 percent) whose learning styles are not congruent plan both careers and graduate training in mathematics (these differences are significant using the Fisher exact test $p < .01$). Similar patterns occurred in the other three departments.

To further test the accentuation process in the four departments, we examined whether the student's choice/experience career development cycle indeed operated as an accentuating positive feedback loop.

FIGURE 5

Career Field and Graduate School Plans for Mathematics Majors as a Function of Their Learning Styles
(Circles indicate that the student is planning to attend graduate school)



If this were so, those students whose learning style dispositions matched and were reinforced by their discipline demands should show a greater commitment to their choice of future career field than those whose learning styles were not reinforced by their experiences in their discipline. As part of a questionnaire, students were asked to rate how important it was for them to pursue their chosen career field. In all four departments, the average importance rating was higher for the students with a match between learning style and discipline norms (the differences being statistically significant in the mechanical engineering and economics departments). Thus, it seems that learning experiences that reinforce learning style dispositions tend to produce greater commitment in career choices than those learning experiences that do not reinforce learning style dispositions.

To examine if this correspondence between learning styles and career field continued in the jobs individuals held in midcareer, we studied about 20 managers from each of five functional groups in a midwestern division of a large American industrial corporation. The five functional groups are described below, followed by our hypothesis about the learning style that should characterize each group given the nature of their work.

1. Marketing ($n = 20$). This group is made up primarily of former salespersons. They have a nonquantitative "intuitive" approach to their work. Because of their practical sales orientation in meeting customer demand, they should have accommodative learning styles (i.e., concrete and active).

2. Research ($n = 22$). The work of this group is split about 50/50 between pioneer research and applied

research projects. The emphasis is on basic research. Researchers should be the most assimilative group (i.e., abstract and reflective), a style fitted to the world of knowledge and ideas.

3. Personnel/Labor relations ($n = 20$). In this company, people from this department serve two primary functions, interpreting personnel policy and promoting interaction among groups to reduce conflict and disagreement. Because of their "people orientation," these workers should be predominantly divergers, concrete and reflective.

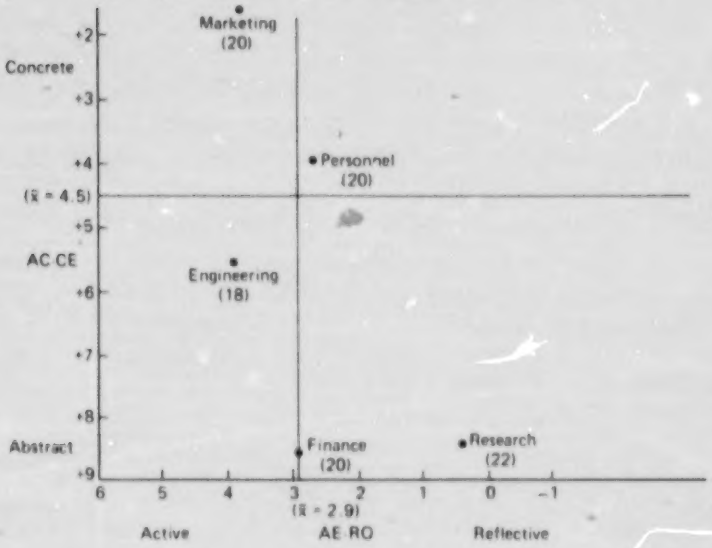
4. Engineering ($n = 18$). This group is made up primarily of design engineers who are quite production-oriented. They should be the most convergent subgroup (i.e., abstract and active), although they should be less abstract than the research group. They represent a bridge between thought and action.

5. Finance ($n = 20$). This group has a strong computer, information-system bias. Financial workers, given their orientation toward the mathematical task of information system design, should be highly abstract. Their crucial role in organizationl survival should produce an active orientation. Thus, finance group members should have convergent learning styles.

Figure 6 shows the average scores on the active/reflective (AE-RO) and abstract/concrete (AC-CE) learning dimensions for the five functional groups. These results are consistent with the predictions above, with the exception of the finance group, whose score is less active than predicted (it fell between the assimilative and the convergent quadrants). The LSI clearly differentiates the learning styles that characterize managers following different career paths within a single company.

FIGURE 6

Average LSI Scores on Active/Reflective (AE-RO) and Abstract/Concrete (AC-CE) by Organizational Functions



We draw two main conclusions from this research. First, the experiential learning typology seems to provide a useful grid for mapping individual differences in learning style and for mapping corresponding differences in the environmental demands of different career paths. As such, it is a potentially powerful tool for describing the differentiated paths of career development. Second, the research data present enticing, if not definitive, evidence that early career choices tend to follow a path toward accentuation of one's learning style. Learning experiences congruent with learning styles tend to positively influence the choice of future learning and work experiences that reinforce that particular learning style. On the other hand, those who find a learning or work

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environment incongruent with their learning style tend to move away from that kind of environment in future learning and work choices. The research to date suggests that accentuation is a powerful force in early career development. Correspondingly, the major cause of change or deviation from accentuation in the early career results from individual choice errors in choosing a career environment that matches the individual style. The primary reason for the strength of the accentuation forces in early career seems to stem from identity pressures to choose a specialized job and career. Integrative fulfillment needs seem to have second priority at this time.

Midcareer Transition and the Move Toward Integration

The developmental model of experiential learning theory holds that specialization of learning style typifies early adulthood and that the role demands of career and family are likely to reinforce specialization. We expect, however, that this pattern changes in midcareer. Specifically, we expect that as individuals mature, accentuation forces play a smaller role. On the contrary, the approach of the middle years brings with it a questioning of one's purposes and aspirations, a reassessment of life structure and direction. For many, choices made earlier have led down pathways no longer rewarding, and some kind of change is needed. At this point many finally face up to the fact that they will never realize their youthful dreams and that new, more realistic goals must be found if life is to have purpsoe. Others, even if successful in their earlier pursuits, discover that they have purchased success in career at the expense of other responsibilities (e.g., to spouse and

children) or other kinds of human fulfillment.

Erikson identifies this as the crisis of generativity vs. stagnation. Continued accentuation of an overspecialized version of oneself eventually becomes stultifying — one begins to feel stuck, static, in a rut. The vitality of earlier challenges too easily is replaced by routinized application of well-established solutions. In the absence of new and fresh challenges, creativity gives way to merely coping and going through the motions. Many careers plateau at this time and one faces the prospect of drying up and stretching out the remaining years in tedium. Finding new directions for generativity is essential.

There is considerable agreement among adult development scholars that growth occurs through processes of differentiation and hierarchic integration and that the highest stages of development are characterized by personal integration. From the perspective of experiential learning theory this goal is attained through a dialectic process of adaptation to the world. Fulfillment, or individuation as Jung calls it, is accomplished by expression of nondominant modes of dealing with the world and their higher-level integration with specialized functions. For many, the needs of modern society are seen to be in direct conflict with these individual needs for fulfillment. Jung puts this case as follows:

> The favoritism of the superior function is just as serviceable to society as it is prejudicial to the individuality. This prejudicial effect has reached such a pitch that the great organizations of our present day civilization actually strive for the complete disintegration of the individual, since their very existence depends upon a mechanical

application of the preferred individual functions of men. It is not man that counts but his one differentiated function. Man no longer appears as man in collective civilization; he is merely represented by a function — nay, further, he is even exclusively identified with this function and denied any responsible membership to the other inferior functions. Thus, the modern individual sinks to the level of a mere function because it is this that represents a collective value and alone affords a possibility of livelihood. But as Schiller clearly discerns, differentiation of function could have come about in no other way: "There was not other means to develop man's manifold capacities than to set them one against the other. This antagonism of human qualities is the great instrument of culture; it is only the instrument, however, for so long as it endures man is only upon the way to culture" (Jung, 1923).

Yet the implication of Schiller's observation is that while human beings are the instrument of culture in their specialized adaptation, they are creators of culture through integrative fulfillment. This can be illustrated by comparing the development of scientific knowledge and the personal career paths of scientists. As Piaget (1970) and others (e.g., Kuhn, 1962) have documented, the historical development of scientific knowledge has been increasingly specialized adaptation; they are creators of culture through integrative fulfillment. This can be illustrated by comparing the development of scientific knowledge and the personal career paths of scientists. As Piaget (1970) and others (e.g., Kuhn, 1962)

have documented, the historical development of scientific knowledge has been increasingly specialized moving from egocentrism to reflection and from phenomenalism to constructivism — in experiential learning terms from active to reflective and concrete to abstract. Yet the careers of highly successful scientists follow a different path. These individuals make their specialized abstract/reflective contributions often quite early in their careers. With recognition of their achievements, comes a new set of tasks with active and concrete demands. The Nobel prize winner must help to shape social policy and to articulate the ethical and value implications of his/her discoveries. The researcher becomes department chairperson and must manage the nurturance of the younger generation. So in this career, and most others as well, the higher levels of responsibility require an integrative perspective that can help shape cultural responses to emergent issues. In fact, there are integrative developmental challenges at all occupational levels. Many first line supervisors, for example, have created personal job definitions that transcend the specialized boundaries of their trade to include the development of younger workers and the building of meaningful community and family relationships.

There is little argument that integrative development is important for both personal fulfillment and cultural development. Yet little research has been done on the integrative phase of adult development. The only study to date on learning styles in later phases of adult development was conducted by Clark et al. (1977). Their study compared cross-sectional samples of accountant and marketing students and professionals at various career stages. The learning

styles of marketing and accounting MBA's were similar, being fairly balanced on the four learning modes. Lower-level accountants had convergent learning styles, and this convergent emphasis was even more pronounced in middle-level accountants, reflecting a highly technical emphasis in the early and middle stages of accounting careers. The senior-level accountants, however, were accommodative in their learning style, reflecting a greater concern with client relations and administration than with technical functions. Marketing professionals at the lower level also were convergent in learning style but became highly concrete at middle-level responsibilities, reflecting a shift from technical to creative concerns. The senior marketing personnel had accommodative learning styles similar to those of senior accountants, probably reflecting the same client and management concerns.

These results indicate that progression to new challenges, even within a given career path, calls for giving up excessive reliance on a specialized style in favor of integrating nondominant (and thus underdeveloped) functions. Thus, many forces — both internal and environmental — generate this period of reexamination and transition to middle adulthood.

The Experience of Crisis in Midlife Transition. Within each of life's major stages, the person maintains a relative balance of personal and situational factors. That is not to say *static*, for one can be quite active in the pursuit of relevant developmental tasks, not to mention in the management of the vagaries of day-to-day life. The equilibrium is reflected, rather, in the patterning of living arrangements (e.g., role relationships in family, school, work tend to persist), and there is general continuity of mean-

ing and purpose. The transitions from one stage to the next, although not always dramatic, tend to be experienced as discontinuities, as disruptions in the flow of life, involving some break with past orientations and arrangements to make room for new development tasks.

At times, as often happens in the transition from juvenile to adolescent, the transition is a major upheaval, fraught with a loss of orientation and purpose. Conditions and events lose their old meanings and are not yet understandable in new terms. Old perspectives no longer quite handle the significant realities and possibilities one senses only dimly. One enters a period of confusion, restlessness, and uncertainty.

Some degree of reorientation is in order for everyone at this stage, requiring a giving up or breaking from some of the old patterns and frameworks. However, many hold doggedly to those things that have provided security, comfort, acceptance from others, or satisfactions. In the face of uncertainty about what comes in their place, the breaking of old patterns is disorienting and anxiety-producing. Consequently, some respond to the middle years with stubborn resistance to change.

When the change is abrupt and pervasive, as in divorce or being fired from a job held over many years, the tension and disorientation reach crisis proportions. Confusion, acute anxiety, depression, anger, resentment, and a sense of helplessness, hopelessness, or worthlessness are not uncommon emotional reactions at such times. The transition, even if growthful in the long run, may be very painful and debilitating for a time.

For a great many people, the transition is difficult and prolonged — the term "midlife crisis" is most apt. As we currently conceive it, a midlife crisis is distinguished from a more evolutionary developmental transition by a number of interrelated characteristics:

1. It is unanticipated or at least unplanned.
2. There is a loss of self-direction and control; the person feels as though events are happening to him/her.
3. Changes are not bounded but expand to encompass the person's whole life space (e.g., a divorce leads to abandoning friends, changing job, moving away, and so on).
4. It creates acute stress and anxiety, influencing the person's day-to-day coping behavior (e.g., inability to concentrate, labile emotions, accident-proneness).
5. Attempts to cope with the crisis are rigid and stereotyped, dominated by black-white thinking. They create more problems than they resolve, producing a vicious downward spiral.

The plaguing dilemma, if the transition involves crisis of any real intensity, is that usual modes of coping interfere with both learning and environmental manipulation. Anxiety, rigidification, and loss of focus undermine those very learning processes that would resolve the crisis and facilitate new growth. Similarly, typical responses to environmental stress —withdrawal, avoidance, attack are seldom effective in setting to right those conditions which create the stress. In the short run, those natural, human reactions to crisis are of service to immediate self-main-

tenance, but they also tend to prolong the crisis without the understanding and help of others or the good fortune of being able to lie low without the rest of one's world going to hell.

Learning and Change in the Transition Process. Whatever the content of the issues and concerns one faces in midlife, there are two process agendas to be addressed if the transition is to be productive in terms of growth and development: changing environmental conditions and investments in personal learning.

To the extent that the transition is precipitated by significant environmental events (e.g., loss of job, divorce) or by internal changes that make one's circumstances untenable or dissatisfying, the transition is likely to call for some kinds of environmental change. For some, this means a rather massive pulling up of roots and moving to a new job in a new location. Others may find that relatively small scale modifications in certain key work or family roles are sufficient.

Role expectations and demands tend to dominate one's life space in early adulthood. One lives by the oughts and shoulds associated with many roles. At some level, one is driven by both career and family role requirements, whether those demands are expressed by others or by the power of the situation (e.g., the needs of a newborn child). One is what one's role calls for, in the extreme, especially if the rewards for specialization are ample.

For many individuals, however, withdrawal of reward for accentuation may be a precondition for the emergence of fulfillment concerns. Our notion here is that rewards for accentuation are often so power-

ful and overwhelming that the individual develops what we call a role-encapsulated ego. That is, rewards for specialized role performance tend to prevent the emergence of nondominant fulfillment needs. Thus, in many cases, withdrawal of these rewards may have to precede the awareness of fulfillment needs.

People as they approach midlife are seldom content to have their lives totally defined from the outside. The other-directedness of early adulthood must give way to a greater sense of being one's own person. This shift alone usually requires some renegotiation of roles, even when the content of one's role-related activities remains the same. Relationships with colleagues, boss, spouse, and children undergo subtle, if not dramatic change. Especially during the transition itself, the role-boundedness of many people's lives must be relieved to make room for the exploration of new possibilities.

The transition from early to middle adulthood involves a breaking from the authority of role expectations toward a centering in oneself as the source of purpose, meaning, and action. Instead of being driven, the mature person becomes the driver. This is not to say that with the transition, one no longer performs his/her roles or cares about the expectations of others. Rather, it means that one begins to recognize the role (and the social structure within which it is embedded) as a platform from which s/he can accomplish purposes s/he owns. The role belongs to her/him, not s/he to the role.

As one becomes autonomous from the excessive demands of role expectations, s/he becomes her/his own person — a nonrole person. Among other things, this

is essential preparation for the time when, through retirement, increasing independence of one's children and the like, one begins a full disengagement from roles altogether, to live out his life with integrity. Increasing personal autonomy and centeredness is part and parcel of the integration of adaptive styles.

A growthful transition inevitably involves the person in new learning ventures, directed both inward and outward. It is a time for giving up some of the illusions and pretenses associated with early adult adaptation. A successful resolution requires more accurate and comprehensive self-knowledge — hence, the turn to introspection and the questioning of one's ambition, drives, wants, and capacities. Thus, learning, especially during critical transitions, is highly personal.

If there is any significant change of scene, one also moves into an active phase of learning about new environmental realities and how they can be understood in terms relevant to one's new purposes. Moreover, a change of career or even taking on new responsibilities in the community is apt to require the development of new competencies or the refinement of underutilized ones. Gaining new knowledge and skills often makes the difference between stagnation and development.

The developmental challenge of the midlife transition is to face up to and move toward those personal and situational changes that show promise of growth and authenticity without causing undue pain or disruption to oneself or others.

Not everyone, of course, faces up to that challenge. Many do not find or recognize the need; life seems to be tolerable in its current plan. Others, fearing

the stress and turmoil, retreat not only from change but even from very deep questioning. Still others find it genuinely fulfilling and recommit to present structures and directions.

Generally, we see the midlife transition as a constructive move toward human fulfillment, toward becoming a whole person and rounding out a life worth living. As in other developmental transitions, the internal psychological work and resultant behavioral and situational changes are the mechanisms through which one corrects the excesses and deficiencies of one's former adaptations. Under favorable conditions, the midlife transition involves minor recalibration on many issues and reorientation toward investing time and energy in those things one cares most about. The move is toward living more authentically, creatively and harmoniously.

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PROBLEM SOLVING, CREATIVITY AND COGNITIVE STYLE

Gerald Gordon

SUMMARY

In this paper we examine the factors that enter into creative problem solving. Two aspects of creative problem solving are discussed: the ability to identify relationships between diverse phenomena, and the ability to identify problems and evaluate solutions. Both of these are related to individual differences in cognitive styles. A predictive model resulting from this framework is tested in a number of different settings. Differences in cognitive styles are hypothesized to be related to right and left brain dominance. The article concludes with a brief discussion of factors leading to the fostering of creative problem solving in work groups.

Creativity has been defined as recognition of an underlying relationship between apparently diverse phenomena. We postulate that creativity takes one of two general forms. It may involve seeing how two different pieces of information relate to one another, or it may involve seeing how a piece of information

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relates to a problem. The first kind of creativity results in recognition of a phenomenological link or pattern, and an example of it would be recognizing the relationship between exposure to the sun and darkening of skin pigmentation. The second kind of creativity results in the solution to a pragmatic problem, usually the development of a way to measure what has previously not been measurable, or to generate new data. An example of this second kind of creativity would be Archemedes' dramatic discovery of the principle which is now named for him. He was taking a bath when he recognized that the change in tub water level corresponded with the seemingly unconnected problem of testing the gold content of the king's crown. With this realization Archemedes lept out of the tub, shouting "Eureka!" Because tools for measurement and for generation of new data are so very important to modern science, this second kind of creative association can be even more significant than the recognition of other natural patterns. In the case of some tools, such as Skinner boxes and linear accelerators, the impact of this kind of creativity is almost revolutionary.

The more obscure the relationship between two phenomena, the more creative the act of recognizing or understanding how they relate to each other. It takes very little creativity, for example, to see a causal relationship between striking someone and inflicting pain. The link between pressure on nerves and stimulation of a pain center in the brain is, by comparison, a fairly obscure one. Making that relationship salient is thus a more imaginative or creative process.

Sarnoff Mednick, one person who has viewed creativity as an associative process, developed the

Remote Associates Test (R.A.T.),[1] which presents lists of phenomena that seem at first glance unrelated, and then asks the test-taker what the phenomena have in common. One test item, for instance, lists blood, cheese, and water: the answer is that "blue" can be applied to all three.

Adopting Mednick's view of the nature of creativity, we reasoned that a person's performance on the R.A.T. should be a good gauge of his potential for creativity. To check this hypothesis, we administered the R.A.T. to researchers in an industrial research and development firm as well as a chemical research company. A comparison of individuals' R.A.T. scores with indicators on their scientific accomplishment (e.g., their ranks in the companies, the number of proposals they had generated, the number of patents they had obtained, the number and size of contracts they had won) suggested a strong correlation between scientific creativity and performance on the R.A.T.

A second and complementary element in our view of creativity is "differentiation ability," the capacity to perceive differences within a given body of data. People whose differentiation ability is low tend to see the world as more uniform that it is, emphasizing its standard, regular, predictable elements. High differentiators, by contrast, emphasize the diversity and variation in the world, and pay special attention to anomalies or apparent inconsistencies.

Differentiation is the opposite side of remote association: you cannot combine apparently diverse phenomena without first recognizing them. To put it most simply, differentiation is involved in perceiving a problem, and remote association is involved in solv-

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ing it. From the above discussion, it should be apparent that high differentiation ability gives a person a great deal of raw material for making remote associations. The higher the ability, the greater the amount of raw material.

Differentiation and association do not, however, necessarily go together. That is, a high differentiator may be low in remote association ability, or vice-versa. A low differentiator can make creative association in several ways. Inconsistencies or problems which he would otherwise miss may be pointed out for him by a high differentiator. This probably occurs frequently where several people of varied abilities work together on one research project. Also, a system, intellectual framework, or situation can perform the same differentiation function as a person, and serve to focus attention on the inconsistency or problem.

Our concept of differentiation developed from our analysis of ratings which directors of research projects had assigned to their relationships with their staff members. We found that the pattern of the directors' ratings, rather than the ratings themselves, bore a strong relationship to the innovativeness of the directors' research. The directors had been given a ten-point scale on which to rate each relationship's quality, and we found that they used the scale in quite different ways. Some used almost the entire scale (giving one relationship a one, another a nine, etc.); others used only a small portion of the scale, giving all the relationships virtually the same rank. The first group seemed to perceive and emphasize differences much more than did the second group. We tentatively labeled the first group social differentiators, and the second group non-differentiators. The empirical support for our theorem follows; here we

shall elaborate on the implications of our theory.

The fact that two distinct, complementary abilities are involved in the scientific creative process, and that both abilities can be tested with some degree of reliability, has important implications for the development of creative teams. Each team member could be placed in a position which capitalized on his particular combination of differentiation ability and associative ability. Consider the following scheme, which represents four possible combinations of these abilities:

Remote Association Ability	DIFFERENTIATION ABILITY: High	DIFFERENTIATION ABILITY: Low
	Integrators (R + D +)	Problem Solvers (R + D −)
	Problem Finders (R − D +)	Technicians (R − D −)

People who are high in both abilities (R + D +) can perceive as well as solve problems. Such people, whom we shall call "integrators," are therefore capable of doing scientific work with a minimum of external direction. They come as close to being self-contained research units as anyone can, given the contemporary inter-dependent nature of scientific research. The integrators' combination of abilities also enables them to comprehend both basic sides of the creative process, which might make them especially good at leading or coordinating a team of researchers.

People who score high on differentiation ability and and low on associative ability (R − D +) we will simply

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call "differentiators." They are good at inferring problems from scientific data, but less good at solving them. Differentiators should be placed in direct contact with a body of data, so they can recognize its unexpected aspects or inconsistencies and point these out to a remote associator who might explain them.

Good remote associators with low differentiation ability, we will call associators or "problem solvers." Since such persons are talented at solving problems which someone or something else focuses for them, they should be in a position where they receive maximum input from high differentiators. Problem solvers would probably not be very useful in direct contact with data, because they have a relatively limited perception of its diversity and possibilities.

People who score low on differentiation as well as association (A – D –) will probably not be particularly creative in recognizing or solving problems. Their contributions to research are more likely to be in the area of technical skill so we will call them "technicians." "Technician" should not be understood here as a derogatory term. Many people in this category are highly intelligent, and can make sophisticated, valuable contributions; but such contributions will probably be of a different, more technical, nature than those of differentiators, remote associators, or integrators.

Insights into the dynamics of social differentiation were gained from studies conducted in a major chemical firm and an industrial research and development firm. Researchers in the chemical company were given a test asking them to rate their fellow associates on three variables — creativity, productivity, and sociability. Each variable was set on a scale ranging

from 1 to 10. In Figure 1 we see both the general format of the scales and the typical response patterns

FIGURE 1. TYPICAL RESPONSE PATTERN

HIGH DIFFERENTIATORS

	Low Creativity									High Creativity
Associate A	1	(2)	3	4	5	6	7	8	9	10
Associate B	1	2	3	(4)	5	6	7	8	9	10
Associate C	1	2	3	4	5	6	(7)	8	9	10
Associate D	1	2	3	4	5	6	7	(8)	9	10
Associate E	1	2	3	4	5	(6)	7	8	9	10
Associate F	1	2	3	4	5	6	7	8	9	(10)
Associate G	1	2	(3)	4	5	6	7	8	9	10
Associate H	1	(2)	3	4	5	6	7	8	9	10
Associate I	1	2	(3)	4	5	6	7	8	9	10
Associate J	1	2	3	4	5	6	7	8	(9)	10

LOW DIFFERENTIATORS

	Low Creativity									High Creativity
Associate A	1	2	3	4	5	(6)	7	8	9	10
Associate B	1	2	3	4	5	(6)	7	8	9	10
Associate C	1	2	3	4	5	(6)	7	8	9	10
Associate D	1	2	3	4	5	6	(7)	8	9	10
Associate E	1	2	3	4	5	(6)	7	8	9	10
Associate F	1	2	3	4	5	(6)	7	8	9	10
Associate G	1	2	3	4	5	(6)	7	8	9	10
Associate H	1	2	3	4	(5)	6	7	8	9	10
Associate I	1	2	3	4	5	(6)	7	8	9	10
Associate J	1	2	3	4	5	(6)	7	8	9	10

of high and low differentiators. For a selected sample it was found that high differentiators, those who made distinctions among their associates on the three factors, wrote 71 percent of the company's disclosures (problem identification) and 65 percent of the patents

(solutions). The decrease in the variable's predictive power from disclosures to solution indicates that the propensity to differentiate is more critical in the identification stage of problem solving.[2]

The question remains if the differences in performance between low and high differentiators are due to differences in their perception of stimuli. In the industrial firm, research was conducted on a group basis. Six group leaders were administered the same differentiation scales used in the chemical firm, part of which required them to rate members of their groups on creativity. The members of each group were administered Mednick's creativity test. As can be seen in Figure 2 there was a .66 correlation between a group leader's differentiation score and ratings by the company's executives of his group's significance to the company and a .86 correlation between group leader differentiation and contracts won by the group. Moreover, in comparing assessments

FIGURE 2. DIFFERENTIATION CORRELATIONS

Variable	r	p
Group Leader's Average Differentiation and Group's Significance to Company	+.66	$p < .10$
Group Leader's Average Differentiation and Group Contracts Won	+.86	$p < .025$
Group Leader's Average Differentiation and Accuracy of R.A.T. Predictions	+.77	$p < .05$

by a group leader of the creativity of the researchers under him with the researchers' creativity scores, the greater the group leader's differentiation score the more accurate his prediction (correlation of .77).[3] Surprisingly, the lack of accuracy on the part of the low differentiating leaders was not random; the low differentiators with some consistency, tended to rate

noncreative researchers as highly creative and creative researchers as noncreative. In addition, high differentiators perceived more variation in the ability of men in their group than was indicated by the creativity test, while the low differentiating project directors saw less variation. We interpreted this to mean that the low differentiators were suppressing or ignoring differences. They were tending to see the universe as more uniform than it really was.

On the basis of the evidence obtained from researchers and their leaders, we believe that differentiation scales are tapping a propensity to perceive accurately environmental stimuli. But accurate perception, while necessary, is not sufficient for innovative problem solving to occur. If normal solutions do not suffice, it becomes necessary, as Mednick has pointed out, for someone to perceive meaningful and useful relations in seemingly disparate data and come up with a unique solution. As previously mentioned, he used this theory as the base for the development of the Remote Associates Test (R.A.T.)

Looking once again at the industrial R & D organization we compared R.A.T. scores with contract proposals written and research contracts won. Half of the scientists in this firm had R.A.T. scores of 19 or more out of 30, and were defined as high Remote Associators (R.A.). High R.A.'s wrote 69 percent of the proposals and 81 percent of the contracts won. Interestingly, only in groups led by high differentiators did R.A.T. scores predict differential productivity. In these groups high R.A.'s greatly outperformed low R.A.'s whereas in groups led by low differentiators there was no appreciable difference in the output of high and low R.A.'s. In essence, almost all proposals

and contracts were produced by high R.A.'s in groups led by high differentiators.

In the chemical company mentioned earlier in reference to the differentiation measures, we compared the Remote Associates Tests to the Harris Simberg AC Test for Creative Ability and the Rokeach Dogmatism Scale. Both these tests have been employed extensively to measure creativity. The Remote Associates Test was a much more accurate predictor of number of disclosures and patents written than either the AC or Dogmatism tests. In tests of final criteria—patents obtained — the top R.A.T. scorers won 93 percent of the patents whereas on the other two tests there was no appreciable difference between high and low scores. The R.A.T. prediction power was just the reverse of differentiation in that it increased from the first stage, disclosure, to the final stage, patent. Although it might appear that the R.A.T. and differentiation scales are tapping the same ability, there was only a .24 correlation between the two measures leading us to conclude that we are dealing with two separate or orthogonal factors.

Essentially, we feel that the R.A.T. is measuring the ability to solve a predetermined problem, but it is not measuring the individual's ability to recognize problems. On the other hand, we feel the differentiation scales are tapping an ability to perceive problems. It is our contention that both abilities play a role in the creative act.

From these assumptions we would expect that persons who were both able to recognize problems and to find solutions to them would be most innovative. Similarly, persons who were problem solvers but who lack the facility to locate problems would

be innovative if others acted as focusers and presented them with problems requiring creative solutions. Persons who could recognize problems but not solve them would be much less innovative than either of the two preceding groups. Finally, persons who could neither recognize nor solve problems would be least innovative. To test these predictions we divided the chemical company researchers into four groups and compared them in terms of disclosures and patents.

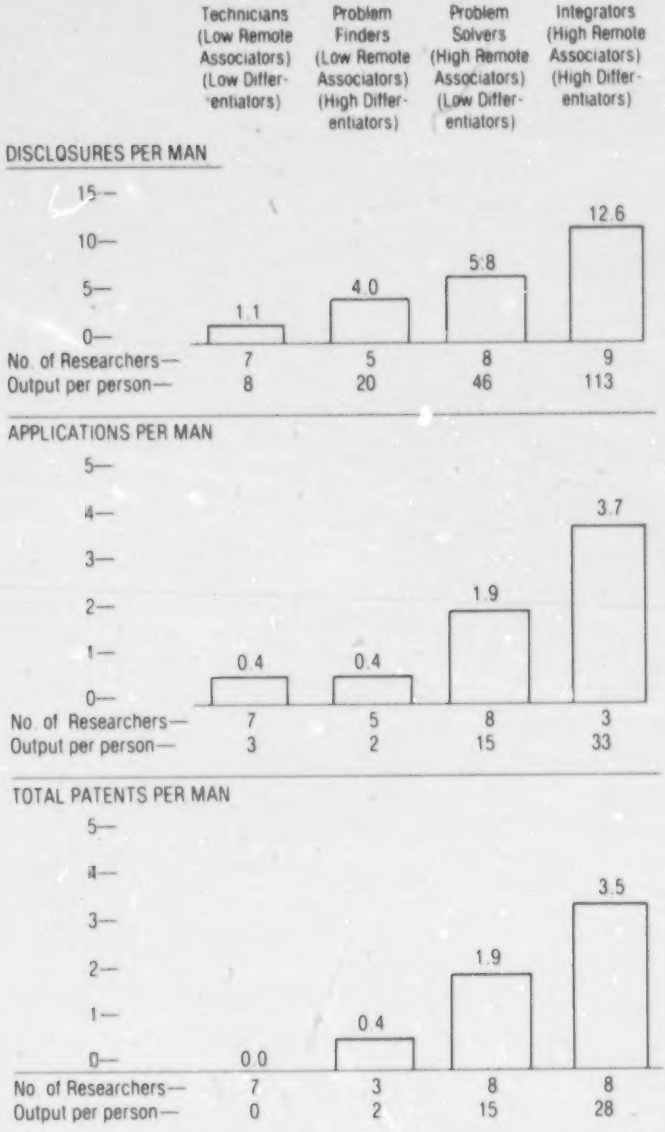
Analytic Groups

1. High Differentiators and High R.A.'s—INTEGRATORS
2. Low Differentiators and High R.A.'s—PROBLEM SOLVERS
3. High Differentiators and Low R.A.'s—PROBLEM RECOGNIZERS
4. Low Differentiators and Low R.A.'s—TECHNICIANS

As can be seen in Figure 3, with one minor exception the predictions hold both in terms of magnitude and direction. Further supporting our assumption, we found that the differences between Groups 1 and 2 in patent applications were due to differences in their disclosure rates. Both groups converted approximately 30 percent of their disclosures into patent applications. On the other hand, only 10 percent of the disclosures of Group 3 (problem recognizers) resulted in applications.

Our concern in working with these concepts is to examine the relationship between cognitive style and creative problem solving. We think this work relates to the emerging body of literature on right and left

FIGURE 3. DIFFERENTIATION, R.A.T.'S AND OUTPUT MEASURES FOR INDUSTRIAL SCIENTISTS



brain function. We postulate that differentiation ability might very well be a right brain function and remote association ability a left brain function. However, rather than deal with dominance, our findings relate to competence. The evidence indicated that for differentiation and remote association, threshold levels occur and that creativity is associated with abilities rather than dominance. Thus, to the extent that there is an association between these concepts and the work on left and right brain, it would lead us to rephrase the right-left brain performance dialogue in terms of adequacy rather than performance.

From a more pragmatic, less speculative perspective our findings bear on the social nature of creativity. It would appear then that the creative act involves both the identification and solution of a problem and, thus, in coordinating the mix of human resources working together, both the ability to make remote associations and to differentiate must be present. Our findings indicate that the creative act often results from the interaction of persons with different cognitive skills. Work groups whose leaders are high differentiators and whose group members are high remote associators tend towards creative problem solving. This provides cues for fostering not only creative work teams, but maximizing an individual's ability to contribute to creative problem solving.

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FOOTNOTES

[1]Sarnoff Mednick, The associated basis of the creative process, *Psychological Review*, Vol. 69, No. 3, p. 221.

[2]For the total sample the percentage approaches the 90 percent level. The same tendency to decrease was found in the total sample.

[3]For low differentiating group leaders there was a negative correlation of .41 between the leaders' evaluations and group members' creativity scores.

OCCUPATIONAL ADAPTABILITY AND TRANSFERABLE SKILLS: PREPARATION FOR TOMORROW'S CAREERS

William L. Ashley
Robert W. Stump

SUMMARY

A variety of skills and abilities developed through both work and non-work experiences are needed by workers in order to enter and progress in a rapidly changing world of work. Additionally, individuals need to develop their occupational adaptability and flexibility to enable them to deal effectively with the increasing number of career and job changes that are characteristic of the current labor force. Both of these needs are discussed and related to the current research program at the National Center for Research in Vocational Education at The Ohio State University. Funded by the National Institute for Education, the Transferable Skills research program has investigated many aspects of career change and their implications for human resource development. Recommendations for research and practice are also presented.

I. OCCUPATIONAL ADAPTABILITY: A REQUIREMENT FOR FUTURE CAREERS

William L. Ashley

The Situation

One of the areas of our lives most profoundly affected by the acceleration of change is the world of work. Most of us spend a large portion of our lives engaged in some sort of work, whether as employees or employers. In American culture, we usually even introduce ourselves by stating what we do. But that, too, is changing, because "what we do" is increasingly in flux.

Occupational mobility, while it was once exceptional, now seems to have become a characteristic of the American labor force. A century ago, most Americans worked in some aspect of agriculture. But industrialization, and now automation and computerization, have had *drastic* effects on the redistribution of labor. By the year 2000, more than 90 percent of the labor force in western cultures could be employed in service industries (Martin, 1977, p. 502). While urbanization in the Third World is expected to slow as those countries' planners turn back to subsidizing growing more of their own food (Brown, 1976, p. 308-309), mobility of the work forces there will continue to be a fact.

Occupational mobility is any move from one job to another. This includes all changes, from a lateral transfer within the same firm (e.g., from fork-lift operator to crane operator) to major career changes (e.g., a garment-cutter finds her job mechanized and starts a new life in the theatre). Any of these job

changes can include major and/or minor differences in knowledge, job skills, environment, context, and expectations. From this perspective, mobility also includes voluntary and involuntary movements, mid-career occupational change, school-to-work or home-to-work transitions, within-industry transfers due to elimination or restructuring of previous jobs or the creation of new ones, and the vocational rehabilitation of handicapped workers.

According to *Forty Million Americans in Career Transition* (The College Board, 1977), 36% of American workers are either unemployed and looking for work, or dissatisfied with their current jobs and considering a change. At the same time, the needs of the labor market are changing. Occupational mobility, for whatever reasons it occurs, has become a fact of American life, and it's no longer enough to educate and train people for one job or one career path.

The results of a more recent (1978) survey show that Americans are changing occupations more frequently than they have in the past. The Bureau of Labor Statistics data on occupational mobility (Rosenfeld, 1979) were obtained in January 1978 through supplemental questions to the monthly Current Population Survey conducted for BLS by the Bureau of the Census. The data pertains to workers 18 years old and over who were not in school at the time of the survey.

The early results show that about 11.5 percent of the men and women surveyed in January 1978 had changed the kind of work they did over the year. Only about 9 percent reported such occupational changes in a similar survey conducted in 1973. Other results of the survey show that:

- Among men, the occupational mobility rate over the January 1977-January 1978 period was about the same for blacks (10.6%) and persons of Hispanic origin (12.2%) as for whites (11.6%).
- Among women, the rate for blacks (7.5%) was below that for whites and Hispanics (12.2% and 11.6% respectively).
- Workers 18 and 19 years old had the highest occupational mobility rates (44.1% for men, 40.8% for women).
- The rate decreased sharply as workers got older and appeared to find their occupational niches. About 35 percent of all workers who changed occupations over the year were under age 25, a group that accounted for only 15 percent of all workers employed in January 1978.
- Occupational mobility rates were lowest for farmers and farm managers and for professional occupations for which extensive capital, education, or training are generally needed. Non-farm laborers had the highest rate of mobility.
- About 7 of 10 persons who changed occupations also changed industries; about 9 of 10 changed employers.

Under these kinds of labor market conditions, where individual job changing is a significant feature and is expected to remain so, education programs will have to concern themselves with improving the ability of individuals to make career changes, and develop the capacity to assist them in making these changes. The idea that one set of occupational skills

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can be learned once in one place and should last a lifetime is not realistic in today's rapidly changing society, if indeed it ever was realistic. It's not a matter of "keeping them down on the farm;" it's helping them switch tractors. There is a need to help individuals of any age prepare not only for a job but for work careers characterized by change.

So far our record in this regard has not been good. Lack of knowledge about the work-world and about one's skills and abilities are major barriers to individual adaptability and career progression. Many youth and adults do not appear to know a great deal about either. For example, in spite of the fact that the average American changes jobs about five times during his or her work-life, and the rate of change is expected to continue to increase in the future, "61 percent of a sample of 32,000 eleventh graders believe that persons never change jobs throughout their adult life" (Prediger, Roth & North, 1973).

Because individual job mobility can be expected to remain a significant feature of contemporary life, the ability of employers to identify and match people effectively with available jobs is extremely important. However, in meetings with employers, personnel managers, and training directors representing a broad spectrum of large and small firms, the general feeling was that: (a) assessment techniques for employment and promotion are crude, (b) many employers are having little consistent success in effectively assessing job applicants for immediate openings, training, or future potential, and (c) credentials typically furnished by schools are of limited practical value to prospective employers (Wiant, 1977).

Since 1976, the National Center for Research in

Vocational Education, under the sponsorship of the National Institute of Education, has been conducting a programmatic study into aspects of the work-related learning experiences of Americans. The major objective of this study has been to gain a better understanding of the phenomenon of occupational mobility and of the role of education in preparing people for a work life increasingly characterized by change.

The program initially focused its investigation on the role of skills in facilitating changes in work. This led to studies that examine the contexts of skill transfer — the commonalities of jobs and job classes (McKinlay, 1976), and the characteristics of occupationally transferable skills (Sjogren, 1977). Additionally, a list of skills that are applicable and transferable across a wide range of jobs was produced (Wiant, 1977). Another study looked at various ways of classifying job tasks across a variety of jobs to identify common skill requirements (Ashley & Ammerman, 1978). It was concluded that "all skills are transferable" to some degree (Altman, 1976). A selected group of 14 training and counseling programs were reviewed (Miguel, 1977) to identify existing practices that appeared to take the concept of skill transfer into account and build upon an individual's prior skills and experiences. About the same time, the program developed a catalog of data bases and classification schemes that provides a ready reference to extant information pertinent to continuing studies of transferable skills (Ashley, 1977).

As program efforts continued, it became increasingly apparent that the transfer of skills was strongly related to individuals' capacities to be occupationally adaptable, and that the one concept could not be adequately understood outside of the context of

the other (Pratzner, 1978). Current program work is investigating the competencies involved in skill transfer and adaptability in work, exploring the relationship between one's awareness of his/her own transferable skills and subsequent job choice and satisfaction, and formulating a theoretical construct of the factors and behaviors that characterize occupational adaptability. Part of the current effort is also concerned with adding new information to what we already know about occupational adaptability and transferable skills, through symposia and the dissemination of their proceedings, and the commissioning of papers by experts on issues of importance (such as job mobility, individual learning styles, and skill assessment). Another component of current work is developing a handbook to aid youth in making transitions from training to working, and guidelines and strategies on identifying and teaching skills for transferability.

One of the ways to help people cope with the problems of occupational mobility is to help them recognize and acquire transferable skills. These are the kinds of skills and abilities that a person carries from one kind of task or job to another, and they fall into categories such as *communication skills, interpersonal skills, reasoning and problem-solving skills, planning and decision-making skills, mathematics skills,* and *manipulative skills.* Having a good range of such kinds of skills can increase a person's options for employment in many jobs across many industries. For instance, a person who has developed the highly transferable skill of speaking persuasively may find that ability applicable to a great many life or employment situations, from salesperson to guidance counselor to public relations person to educator

to entertainer, and so on. Another person highly proficient in the transferable skill of planning could apply it in such diverse fields as rancher, educator, manager, buyer, production designer and builder.

The great advantage of having highly transferable skills is that they may enable someone to perform in many kinds of jobs, and they can cut down significantly on necessary retraining. Another advantage is that knowing he/she has highly transferable skills can expand a person's control and range of choices in life and work situations. Not only can the individual adapt to the situation, he/she now has some tools with which to begin to change the situation — at least as it affects his or her life — or to move to another situation that is more suitable.

Skills Alone Do Not Adaptability Make

At this point in our work we believe that possessing technical skills which are applicable to different jobs will not alone assure success in dealing with job change. Having skills that are required to perform the tasks of a job or several different jobs is only one of the essential components needed to be occupationally adaptable. There appear to be a number of other abilities and skills that relate to one's capacity to adapt and cope with change, both within a job and across jobs.

We offer the following as a working definition of occupational adaptability and welcome any suggestions for further clarification and extension of the concept. As it relates to workers, we think occupational adaptability is "an individual's capacity to adapt to changes in the work environment and to adapt the work environment to one's self."

A few examples of skills that might characterize an individual who can adapt to changes in the work environment would include the ability to "detach" or "un-hook" oneself from previous mental and psychomotor frames of reference and quickly adopt new ones as the situation requires. This might be demonstrated by the ability to shift from a uni-dimensional to a multi-dimensional approach to planning and organizing work. Another example might be the ability to develop several alternative ways to perform a task when the traditional approach is impractical or impossible. Both of these are highly transferable and useful skills in many occupations. We also might expect the adaptable individual to be able to shift from one performance to another and back to the first with ease — thus demonstrating a capacity to deal with situations with rapidly changing priorities.

Adaptability would also include the capacity of an individual to effectively influence the work environment and to adapt it to his/her own interests, talents, expectations and needs. Adaptation of the work environment might include such activities as expanding one's job responsibilities in order to do new things or bring unused skills into action. Seeking ways to be innovative or inventive on the job, taking advantage of in-house learning opportunities to prepare for another position, and applying one's special abilities to help co-workers are a few other examples of ways that a person might adapt the work environment to his or her special interests, talents or skills.

One of the major research activities of the Transferable Skills program was to conduct a national survey of adults to determine their perceptions about a set of competencies or skills that are basic to occupational adaptability. A national probability sample of

2083 individuals, age 18 and older, was interviewed by Opinion Research Corporation. The survey instrument consisted of 39 competency statements. The three questions asked about each competency were:

1. Where should a person be taught this competency?
   a. at home
   b. in school
   c. on the job
   d. somewhere else
2. Where do most people actually learn this competency?
   a. at home
   b. in school
   c. on the job
   d. somewhere else
3. If a person did not have this ability, how well would he or she do at work?
   a. do well at work
   b. have some problems at work
   c. have a great deal of difficulty at work

Standard demographic information about each respondent was also collected.

Currently we are in the process of conducting a series of statistical analyses of the data. I will, however, limit my discussion to reporting two findings derived from our preliminary analysis that would seem to be of particular importance to people in industrial training and development.

Which are the most important competencies? The competencies that were perceived to be most important (that is, the ones that would cause the

greatest difficulty at work if an individual had not mastered them) are reported in Table 1.

Table 1
MOST IMPORTANT COMPETENCIES
(in Rank Order)

#		%
5	Use the reading, writing and math skills the job calls for	54
7	Use the tools and equipment the job calls for	52
6	Get along with others	51
16	Deal with pressures to get the job done	48
26	Follow rules and policies	48
15	Have a good work attitude	45
23	Follow job safety and health rules	43
2	Hold a job that matches one's interests and abilities	40
3	Get a job for which one has the training and background	39
13	Get information about what is expected of you when starting a new job	37
18	Work without supervision, if necessary	35

Of the "competencies" rated as most important, numbers 3 and 5 were judged to be actually learned in school and numbers 6 and 15 learned in the home. The remaining seven competencies were believed to be learned on the job. It can be concluded from this finding that there is a shared responsibility between home, school, and work for helping individuals learn the eleven competencies that were judged as most important to success in work.

Where are the competencies learned? A listing of the competencies that a plurality of the respondents thought most people actually learn on the job is presented in Table 2. Category titles are based on the manner in which the competencies clustered, as indicated by a factor analysis of the importance ratings given by all respondents. Of the 39 compe-

tencies, 28 were identified by a majority of the respondents as actually being learned on the job.

Table 2
COMPETENCIES LEARNED AT WORK

***Matching One's Personal Job Preference**
Hold a job that matches one's interests and abilities
Know if one wants to own a business or work for someone else
Use the tools and equipment a job calls for
Do parts of the job one may not like to do
Interview for different job positions when necessary
Fill out forms as required by law or by an employer
Use materials and the knowledge of other people to develop one's job interests
***Traditional Job Values**
Get information about what is expected of you when starting a new job
Deal with pressures to get the job done
Tell others what you are doing or what you want done
Work without supervision, if necessary
Follow job safety and health rules
Deal with unexpected things that happen
Know one's rights as an employee
Follow rules and policies
***Being Innovative—Taking Risks**
Figure out a better way to get things done
Get support from others to change things that need changing on the job
Do things at work in a new way when one gets the chance
Take chances that may result in rewards
***Personal Benefit**
Be a member of a union or professional group
Know when one's own work is being done well
Learn new job skills to get a different job or position
Get promoted on the job
Ask for a raise in salary
Decide how and when to leave a job for another job
Use what one already knows to do a new or different job
Understand wages and deductions on one's pay stub
Understand the extras or benefits offered at work

*Competency by groupings are based on factor analysis results

Of the total 39 competencies, four were judged to be learned primarily at home and four others primarily in school as indicated in Table 3.

Table 3
COMPETENCIES LEARNED AT HOME OR SCHOOL

Learned at Home
• Get along with others
• Dress and act properly
• Have a good work attitude
• Manage one's own time and activities
Learned at School
• Know what kind of work one wants to do
• Get a job for which one has the training and background
• Use the reading, writing, and math skills the job calls for
• Know where to look for information about jobs one has or would like to have

In addition, there were three competencies that were judged to be learned equally in all three places (home, school, work) or learned in various combinations of the three.

Table 4
LEARNED IN COMBINATION OF PLACES

• List job interests, skills, and experiences for an employer
• Persuade others to one's way of thinking
• Figure out the cost of using one's own car or public transportation in getting to and from work

Summary of Survey Results

The survey results indicate that the general public holds fairly distinct perceptions or opinions about where certain competencies related to work are learned. Of the total of 39 competencies, 28 of them (71%) were judged to be learned at work, four others

(10%) are learned at school, an additional four (10%) learned at home, and the remaining three (8%) learned in a combination of these places.

As in any survey there is latitude for various interpretations of the basic findings. For example, one might suspect that many of the enabling behaviors required for each competency are learned in a variety of places over a long period of time but that the competencies take on real meaning and importance when they are applied in the work place; hence, people perceive that they learned the competency at work. A more literal interpretation, however, would be that people actually do develop the competencies through on-the-job application or through formal or informal learning at work.

In either case, the data from the survey indicate that the competencies appear to have a great deal of construct validity and were perceived as important to doing well in work.

Several implications can be drawn from the initial findings. These are summarized as questions:

- Should employees expect to learn certain competencies on-the-job?
- If so, which competencies?
- If many work-related competencies are being learned on the job, is there an appropriate structure to facilitate such learning?
- If certain competencies should be taught in the home and/or in the school, are they being learned for application in work?
- Is there a relationship between job performance and/or satisfaction and the extent to which workers have developed any of the competencies?

Certainly, more research and thought needs to be directed toward the issues of worker competencies: what they are, where they should be learned, and for what ends they should be learned. The need to improve and utilize human resources in work will remain an urgent one during the next decade for employee and employer alike.

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II. TRANSFERABLE SKILLS AND JOB CHANGES

Robert W. Stump

Introduction

There are many aspects to the challenge of creating educational or training programs to prepare individuals for the work world. However, a simple logic seems to underlie most thinking, planning and doing in this area, and this logic is used by vocational planners and trainers as well as by those in more general educational programs who have a concern for their student's experiences after graduation.

The logic dictates several steps in the process:

- Know the current and emerging occupational opportunities;
- Identify the opportunities that require training or those components of the individual's work-required abilities that can be trained or educated;
- Specify what the content of the preparation might be;
- Understand which vacancies might (will) be filled by individuals after training or education;

- Enroll individuals in the preparation programs in time to be ready when the opportunities are there.

As simple as this sounds, our ability to bring off all these steps seems very limited. Failures far outnumber successes. Successes usually are traceable to specific local contacts between employers and trainers. Reasons for failure are attached to each of the steps in the process (lack of data, bad or inappropriate projections of opportunities, poor training programs, etc.) or to the failure to integrate across steps (employers and trainers or educators don't work together to design programs).

We, The National Institute of Education and the National Center for Research in Vocational Education, have cooperated for the last three years on a project that took a different approach to educational preparation for Careers. We began with a simple notion. An individual's experience in the world of work is characterized by the almost universal phenomenon of occupational change. Some people do it more often than others, but almost everyone does it. Our question then became, "What educational or training program content is appropriate in preparing individuals for a life that is characterized by occupational change?"

To help the reader get into the spirit of our project findings, we suggest a pause to consider the following three questions in the context of personal experience. Key terms may be defined in the way you are most comfortable with.

1. Since starting full time work, how many different jobs have you held?

2. Considering all the jobs you have held, which were the two most dissimilar?
3. In spite of their dissimilarity, were any of your skills and abilities useful in both jobs? Which ones?

Occupational Change

With the exception of an early study by Jaffe and Carlton, only in the last decade has good information been available on the extent of occupational change in the U.S. Labor market. In the January 1973 Current Population Survey, the respondents were asked to identify the occupations they held in January 1972. Based on a shift from one of the 441 occupations in the Census classification scheme to another, one out of 11 individuals (6.7 million Americans) reported a different occupation in 1973 from 1972 (see Table 1). In the 1970 decennial Census, Americans were asked what their occupation was in 1965. Almost one in three reported in 1970 being employed in a different occupation from the one they had in 1965 (see Table 2). When this figure is adjusted for individuals who had left the labor force, the proportion jumps to over 40 percent (Sommers and Eck, 1977). A greater proportion of the young are occupation changers; up to 50 percent of changers are under 30. However, they do not have a monopoly on the practice. Fully one in four (25%) of the men and women between the ages of 50 and 59 reported a different occupation.

While the amount of change from one year to the next or from five years before may be substantial, change in itself may not be significant. What about the magnitude of the change, at least in terms of the

TABLE 1

Percent[1] of Workers who Changed Occupations in 1972, by Age, Sex and Race

AGE	White		Black and other races	
	Men	Women	Men	Women
Total, 13 years old and over, not in school	8.9	8.5	9.5	6.2
18 and 19 years	38.3	36.2	27.9	[2]
20 to 24 years	24.9	19.4	25.6	12.4
25 to 34 years	12.4	10.3	12.3	8.0
35 to 44 years	6.2	6.6	6.4	4.1
45 to 54 years	3.6	3.4	3.2	2.8
55 to 64 years	2.6	2.2	2.8	4.0
65 years and over	1.7	2.8	1.5	....

[1]Percentage reflects the proportion of workers employed in both January 1972 and January 1973 who had a different occupation in January 1973 than in January 1972.

[2]Rates not shown where base is less than 75,000.

TABLE 2

Percent Distribution by 1970 Status of Persons Employed in 1965, by Age in 1965 and Sex

Age and Sex 1965	Status in 1970			
	Employed in Same Detailed Occupation	Transferred to Different Detailed Occupation	Unemployed	Not in Labor Force, Dead, in Armed Forces
All workers	44.8	32.2	2.3	20.8
Males				
16 and over	47.2	34.6	2.3	15.1
16-19	20.0	57.6	3.9	18.5
20-29	41.1	51.4	2.6	5.0
30-39	55.9	37.5	2.1	4.6
40-49	59.0	31.6	2.1	7.3
50-59	52.6	25.5	2.2	19.6
60 and over	21.2	11.9	1.4	65.5
Females				
16 and over	40.3	27.2	2.3	30.0
16-19	19.9	37.6	3.2	41.2
20-29	32.1	28.9	2.5	36.4
30-39	47.5	31.5	2.5	18.5
40-49	50.9	30.2	2.3	16.7
50-59	47.5	24.8	1.9	25.7
60 and over	21.4	12.0	1.2	65.3

Source: Dixie Sommers and Alan Eck, "Occupational Mobility in the American Labor Force," **Monthly Labor Review**, January 1977.

occupations held? The 1970 Census data groups each of the 441 occupations into one of thirteen major occupational groups, such as professional, technical and kindred, clerical workers or craft workers. When individuals changed from one detailed occupation to another, did they also move into a different major group? The ratio of those changers leaving the major group to those staying in the group tells the story (see Tables 3 and 4). For professional men and women, the chances are fairly even that a move will be to an occupation that is still in the professional group. But their pattern is the exception rather than the rule. Managerial workers are four times (males) and seven times (female) as likely to move to another major occupational area when they change. In sales occupations, the chances are 25 to 1 for women and 10 to 1 for men that they will move out of a sales-type occupation when they move. Male craft workers are twice as likely to move out of the craft group, while women craft workers are five times as likely to move out than to stay in craft occupations. In almost every case except professionals and female clerical workers, the chances of making a major change when moving to a new occupation are greater, often dramatically so.

At the same time, we realized that studying mobility with categories of occupation titles and industry designations, even at the most detailed Census level, would not be helpful for planning educational and training programs. Training imparts knowledge, skills and abilities, so we wanted to understand the composition of mobility and training needs in these terms as an aid to educational program planning.

TABLE 3

Percent Distribution by 1970 Status of Persons 16 Years Old and Over Who were Employed in 1965, by Major Occupations and Sex Groups in 1965

1965 Status	Status in 1970				
	Not in Labor Force, Dead, in Armed Forces	Same Detailed Occupation	Different Detailed Occupation		Ratio of Different Group to Same Major Group
			Same Major Group	Different Major Group	
Female					
Professional, Technical and Kindred	28.4	54.9	8.5	8.2	1.0
Management and Administration	29.0	45.3	3.3	22.4	6.8
Salesworkers	35.4	40.6	.9	23.1	25.7
Clerical Workers	31.4	43.6	16.6	8.4	.5
Craftworkers	28.2	47.8	3.9	20.1	5.2
Operative, ex. Transport	32.8	45.9	10.8	10.5	1.0
Transport Operatives	21.8	51.5	2.2	24.5	11.1
Laborers, ex. Farm	32.6	31.4	2.1	33.9	16.1
Farmers and Farm Managers	38.6	31.0	.6	28.9	48.2
Farm Laborers	54.2	22.5	1.2	22.1	18.4
Service Workers	35.1	43.2	6.7	15.0	2.2
Private Household	37.8	44.2	4.4	13.6	3.1
All Occupations	32.3	42.1	12.3	13.3	1.1

TABLE 4

Percent Distribution by 1970 Status of Persons 16 Years Old and Over Who were Employed in 1965, by Major Occupations and Sex Groups in 1965

1965 Status	Status in 1970				
	Not in Labor Force, Dead, in Armed Forces	Same Detailed Occupation	Different Detailed Occupation		Ratio of Different Group to Same Major Group
			Same Major Group	Different Major Group	
Male					
Professional, Technical and Kindred	11.1	62.9	14.3	11.7	.8
Management and Administration	15.3	60.1	4.7	19.9	5.3
Salesworkers	15.3	55.0	2.7	27.0	10.0
Clerical Workers	15.9	45.7	10.4	28.0	2.7
Craftworkers	10.7	60.0	8.1	15.2	1.9
Operative, ex. Transport	16.6	47.2	10.7	25.5	2.4
Transport Operatives	16.4	54.6	5.1	23.9	4.7
Laborers, ex. Farm	22.8	33.6	4.7	38.9	8.3
Farmers and Farm Managers	25.3	57.0	1.7	16.0	9.4
Farm Laborers	26.0	37.3	2.6	34.1	13.1
Service Workers	22.7	48.0	5.1	24.2	4.7
Private Household	32.5	39.9	8.6	19.0	2.2
All Occupations	17.4	49.6	11.8	21.2	1.8

Source: Compiled from data presented in Dixie Sommers and Alan Eck, "Occupational Mobility in the American Labor Force," **Monthly Labor Review**, January 1977.

TABLE 5

Composite List of Transferable Skills Identified by Conference Participants[a]

Intellectual/Aptitudinal		Interpersonal	Attitudinal
Communicating (44)	Trouble shooting	Working with, getting along with, or relating to to others (28)	Dilligence, or a positive attitude toward the value of work (11)
Problem solving (17)	Job awareness	Managing, directing, or supervising (13)	Receptivity/flexibility/ adaptability
Analyzing/assessing (15)	Mechanical aptitude	Empathizing, or being sensitive to others	Determination/perseverance
Planning/layout (14)	Typing	Teaching, training, or instructing	Acceptance/appreciation/ concern for others
Decision making (13)	Accounting	Counseling	Responsibility
Creativity/imagination/ innovation	Implementing	Motivating	Willingness to learn
Problem identification/ definition	Self-understanding, awareness, actualization	Gaining acceptance, or building rapport	Ambition/motivation
Managing ones own time	Situational analysis	Helping, or cooperating	Self-confidence
Basic computation	Assessing environments/ situations	Cultivating cooperation	Self-discipline
Logical thinking	Understanding human system interactions	Selling	Pride
Evaluating	Organizational savvy	Accepting supervision	Enthusiasm
Ability to relate common knowledge or transfer experiences	Conceptualization	Delegating	Patience
Coping with the labor market and job movement	Generalization	Instilling confidence	Self-actualization
Understanding others	Goal setting	Team building	Assertiveness
Synthesizing	Controlling		Honesty
Marshalling available resources	Quantitative thinking		Loyalty
Accommodating multiple demands	Dealing with work situations		Reliability
Judgment	Finance		Risk taking
Foresight	Tool usage		Compromising
	Bookkeeping		Kindness
	Artistic ability		
	Business sense		
	Tolerance of ambiguity		

[a]Items are listed in approximate order of frequency within each category. Most frequently mentioned items are followed by a figure in parenthesis to indicate relative frequency; thus, "Communicating" was mentioned about 44 times as often as "Tolerance of ambiguity."

Source: Wiant, A.A. **Occupational Change and Transferable Skills: The Employers Viewpoint**, Columbus, Ohio: The National Center for Research in Vocational Education, 1980.

TABLE 6

Content of Core Skill Clusters of Nonsupervisory Occupations in Generic Skills Project

Skills Areas			
Mathematics	**Communications**	**Interpersonal**	**Reasoning**
1. Read, write, and count whole numbers.	1. Know plurals.	1. Attend physically.	1. Obtain information about tasks, materials, and equipment.
2. Add and subtract whole numbers.	2. Know prefixes and suffixes.	2. Attend cognitively.	2. Obtain information about methods and procedures.
3. Multiply and divide whole numbers.	3. Contractions and abbreviations.	3. React to others.	3. Obtain information about sequence.
4. Solve word problems with whole numbers.	4. Use dictionary.	4. Elementary one-to-one conversation.	4. Obtain other job related information.
5. Round off whole numbers.	5. Synonyms, antonyms, and homonyms.	5. Task-focused conversation.	5. Recall theories or principles.
6. Read and write fractions.	6. Meaning from context.	6. Express point of view.	6. Sort objects.
7. Add and subtract fractions.	7. Use books.	7. Personable conversation.	7. Estimate time.
8. Multiply and divide fractions.	8. Comprehend oral communication literally.	8. Participate in group discussion.	8. Estimate weight.
9. Solve word problems with fractions.	9. Interpret oral communication.	9. Respond to information or directions.	9. Estimate distance.
10. Compute dollars and cents.	10. Pronounce words correctly.	10. Give instructions.	10. Sequence tasks.
11. Read, write, and round off decimals.	11. Use good diction and word choice.	11. Demonstrate.	11. Establish task priorities.
12. Mutiply and divide decimals.	12. Speak fluently.	12. Monitor.	12. Set goals.
13. Add and subtract decimals.	13. Organize ideas while speaking.	13. Give directions.	13. Determine activities to reach goals.
14. Solve word problems with decimals.	14. Ask the six W questions.		14. Decide about alternatives.

Skills Areas			
Mathematics	**Communications**	**Interpersonal**	**Reasoning**
15. Read and write percents.	15. Give directions or information.		15. Set criteria.
16. Compute percentage.	16. Use the telephone.		16. Set priorities.
17. Determine equivalents.	17. Literal comprehension or reading.		17. Analyze situation.
18. Know order of operations.	18. Interpretive comprehension of reading.		18. Make deductions.
19. Solve word problems (mixed operations).	19. Read forms.		19. See cause and effect relationships.
20. Do quick calculations.	20. Read notes, letters, memos.		20. Identify possible problems.
21. Compute averages.	21. Read charts and tables.		21. Set priorities in terms of diagnosis.
22. Read graduated scales.	22. Read manuals.		22. Explore possible methods.
23. Perform operations with time.	23. Write phrases on forms.		23. Ask probing questions.
24. Operate calculator.	24. Write sentences on forms.		24. Use senses.
	25. Write sentences.		25. Determine relevant information for problem solving.
	26. Write short notes.		26. Arrive at alternative statements.
	27. Take notes.		27. Select statement.
			28. Determine alternative solutions.
			29. Select alternative.
			30. Update plans.

Source: Sjogren, D. D. **Occupationally Transferable Skills and Characteristics**: Review of Literature and Research. Columbus, Ohio: The National Center for Research in Vocational Education, March 1977.

TABLE 7

Content of Core Skill Clusters of Supervisory Occupations in Generic Skills Project

Skills Areas			
Mathematics	**Communications**	**Interpersonal**	**Reasoning**
1-24. Same as nonsupervisory occupations.	1-27. Same as nonsupervisory occupations.	1-13. Same as nonsupervisory occupations.	1-30. Same as nonsupervisory occupations.
25. Compute ratios.	28. Evaluative comprehension in listening	14. Attend covertly or unobtrusively.	31. Sort data.
26. Compute proportions.	29. Evaluative comprehension in reading.	15. Persuasive conversation.	32. Rate objects.
27. Compute rates.	30. Write paragraphs on forms.	16. Prepare group discussion.	33. Rank objects.
28. Compute principal.	31. Write paragraphs.	17. Present information or directions to group.	34. Develop classifications.
29. Measure weight.	32. Write form letters.	18. Lead group discussion.	35. Estimate area.
30. Measure distance.	33. Write single paragraph letters.	19. Maintain groups.	36. Estimate capacity.
31. Measure capacity.	34. Write internal memos.	20. Prepare oral presentation.	37. Estimate cubic measures.
32. Know geometric forms and figures.	35. Write business letters.	21. Give factual information in oral presentation.	38. Estimate costs.
33. Computation on angles.	36. Write information reports.	22. Get attention and response to oral presentation.	39. Plan and coordinate activities and sequences.
34. Draw/sketch geometric forms and figures	37. Write recommendation reports.	23. Give a conceptual oral presentation.	40. Outline plans.
35. Compute perimeters.	38. Write technical reports.	24. Give a persuasive oral presentation.	41. Identify resources.
36. Compute areas.		25. Get reaction to oral presentation.	42. Estimate resources.

Skills Areas			
Mathematics	**Communications**	**Interpersonal**	**Reasoning**
37. Compute volumes.		26. Establish training program.	43. Determine critical activities.
38. Read graphs.		27. Evaluate instructional communication.	44. Make a detailed plan.
39. Read scale drawings.		28. Demonstrate to others.	45. Make resource requisitions.
40. Read assembly drawings.		29. Give praise.	46. Monitor results.
41. Read schematic drawings.		30. Give discipline.	47. Determine standards of quality.
42. Draw graphs.		31. Prepare evaluation reports.	48. Determine standards of quantity.
43. Measure from scale drawings.		32. Prepare for interview.	49. Determine standards of completion time.
44. Draw to scale.		33. Ask closed questions in interview.	50. Establish priorities of standards.
45. Solve algebraic formulas.		34. Ask open questions in interview.	51. Exercise authority and responsibility.
		35. Deal with confrontation situation.	
		36. Interview customers/clients.	
		37. Interview job applicants.	
		38. Negotiate.	

Source: Sjogren, D. D. **Occupationally Transferable Skills and Characteristics**: Review of Literature and Research. Columbus, Ohio: The National Center for Research in Vocational Education, March 1977.

Transferable Skills

The questions posed earlier for reader reflection became a central part of one approach to finding out what skills and abilities are required by a variety of occupations, i.e., transferable. We postulated that if more occupations require certain skills and abilities, these individual capabilities are more transferable. In fall 1976 and spring 1977 we held a series of nine meetings in non-randomly selected cities throughout the country and invited non-randomly selected representatives of employers, labor unions and training programs to talk with us about transferable skills. Their responses to these initial questions provided grist for a day's discussion of whether such skills and abilities exist, what they are, and how they might be used by individuals who are trained, hired or promoted. A composite list of their responses is presented in Table 5. The loosely defined categories of intellectual/aptitudinal, interpersonal and attitudinal were afterthoughts and are intended to reflect the participants' judgments that qualities other than skills, narrowly defined, are useful for several occupations.

Another approach was to search the literature for reports of other research efforts to identify skills and abilities that are common to a variety of occupations. We found several approaches. A series of job analyses by the Canada Employment and Immigration Commission resulted in the lists of generic skills and abilities presented in Tables 6 and 7.

The similarities among the lists generated by our meetings, by the research in Canada and by similar efforts in the U.S. of Neeb, Cunningham and Pass, and of Mecham and McCormick and of O'Neil con-

firmed our hunch that some skills are applicable to a variety of occupations, and that these skills are identifiable through an analysis of occupational requirements that could be simple and/or quite detailed and complex.

Some Conceptual Notes

We continually confronted ambiguous and sometimes conflicting ideas associated with terms such as skill, behavior, attitude, etc. Is a skill the ability to do something, or the actual doing of it? How about the idea that skill implies level of proficiency? What is observable in training and/or job performances?

No solution to these difficulties will be acceptable to everyone. If it were, there would be no confusion. Nevertheless, we have tried to be explicit in what we mean by some of the key terms. The key objective of training and the critical element in jobs is performance or behavior. A trained individual or worker is first and foremost able to perform the duties of the job. Thus, we begin any examination of job or training needs with a consideration of the observed or required behavior, i.e., what does the person do?

When behavior is observed, several components of the behavior can be identified and inferred to contribute to behavior. At the general level we consider these to be knowledge, skill and attitude. As graphically represented in Figure 1, behavior (or performance) can be seen as a triangle whose three sides, knowledge, skill and attitude, are all required for one to be able to perform. Just as there is no triangle without all the three sides, we suggest that there is no performance without all three individual components. (Although it is not central to our current dis-

cussion, levels of performance could be analyzed in terms of the adequacy or correctness of the individual's skills, knowledge or attitude.)

Therefore, *skill* is an underlying component of behavior, a "human capacity or potential that resides within individuals" (Pratzner, 1978, p. 2). *Knowledge* is the information needed to be able to perform. It can be within the individual or outside and accessible to him or her. *Attitude* represents the value dimension of performance by which an individual places meaning on the performance and decides to do or not to do the task, and how well to do it.

Figure 1
The Components of Performance

Our discussion of transferable skills with the employer representatives clearly concluded that all three dimensions of performance are transferable and important to being able to perform in a variety of situations. Similarly, some of the other NIE/NERVE research studies were concerned with combinations of knowledge, skill and/or attitude as the components of performance common to a variety of occupational situations.

These distinctions have some importance for training programs whose objective is to prepare individuals for specific jobs and, more importantly, for a life in the world of work that will include occupational changes. An illustration from the Generic Skills Project of the Canada Employment and Immigration Commission will help develop this perspective.

In a series of surveys from 1973 to 1976 workers in 49 occupations and supervisors in 28 of them were asked to identify the skill requirements of the occupations. (Correlations between the two groups exceeded .95). The occupations tended to be the skilled and semi-skilled type, and clustered into 10 occupational families. The skill requirements studied were Generic Communications, Generic Mathematics, Interpersonal, Reasoning and Science. (Their notion of skill, in the terms outlined above, would be performance or combinations of skill and knowledge with attitudes assumed).

Among the Generic Communications Skills, for example, "reading forms" seems to be pretty universal both within each family and across all the families. "Making oral presentations" is not important to many occupations within nor across the families, except for foremen and supervisors. From these

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surveys, reading, conversing, listening and, to a lesser extent, writing are very important to almost all the occupations studied (see Figure 2).

Generic Mathematics skills show the need for arithmetic within and across the families. This is less true for geometry and intermediate mathematics. As expected, however, occupations in the engineering technologists family rely heavily on the entire range of mathematics skills. Thus, within the area of generic mathematics skills, the skilled and semi-skilled occupations show varied requirements (see Figure 3).

There seems to be very little transferability of the Generic Science skills within and across the families surveyed, with one exception. "Set/Test Hypotheses" is needed in all or almost all occupations within each of the families and across all families. This performance refers to the systematic scientific method of inquiry and problem solving (see Figure 4).

A comparison of these three performance areas offers another insight. As the requirements progress from reading and simple mathematics to more advanced mathematics and to science skills, the components of knowledge increase; i.e., the amount of knowledge required to perform is greater. At the same time, the applicability of these performances to many jobs within the families and across the families decreases. The implication is that *bodies of knowledge* are perhaps less transferable; i.e., applicable to fewer occupations than the *skills* used in or needed by a variety of occupations.

We do not want to imply that knowledge is not essential. Indeed it is. Rather, some kinds of knowledge seem to be less transferable across jobs. It may be, however, that the ability to *access* knowl-

Figure 2

GENERIC COMMUNICATONS

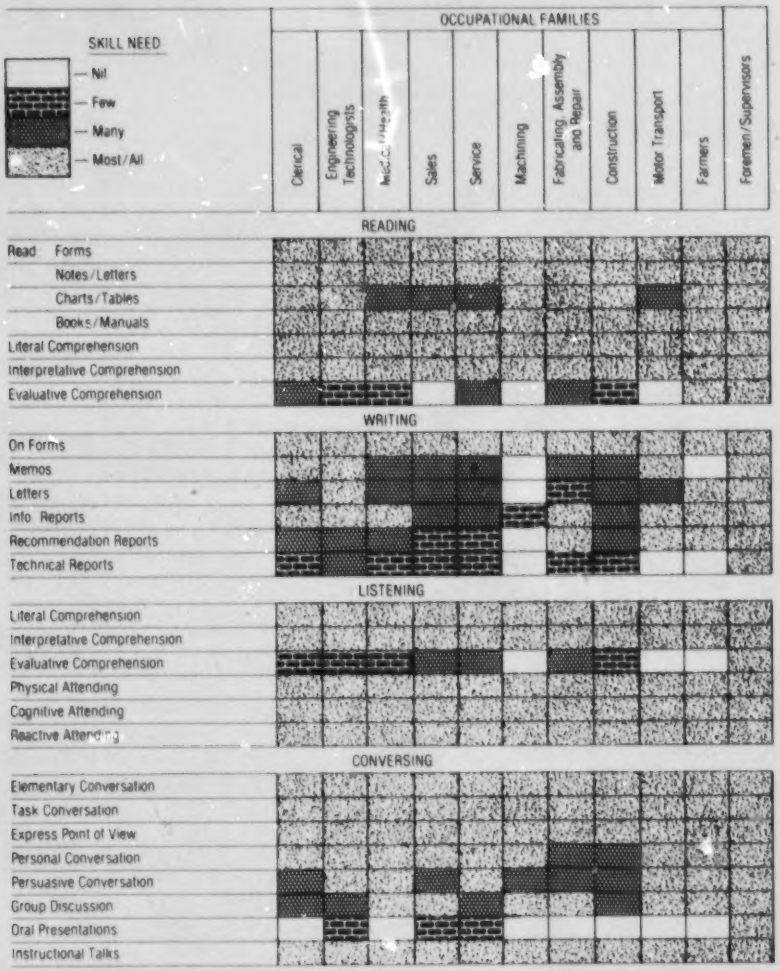


Figure 3

GENERIC MATHEMATICS

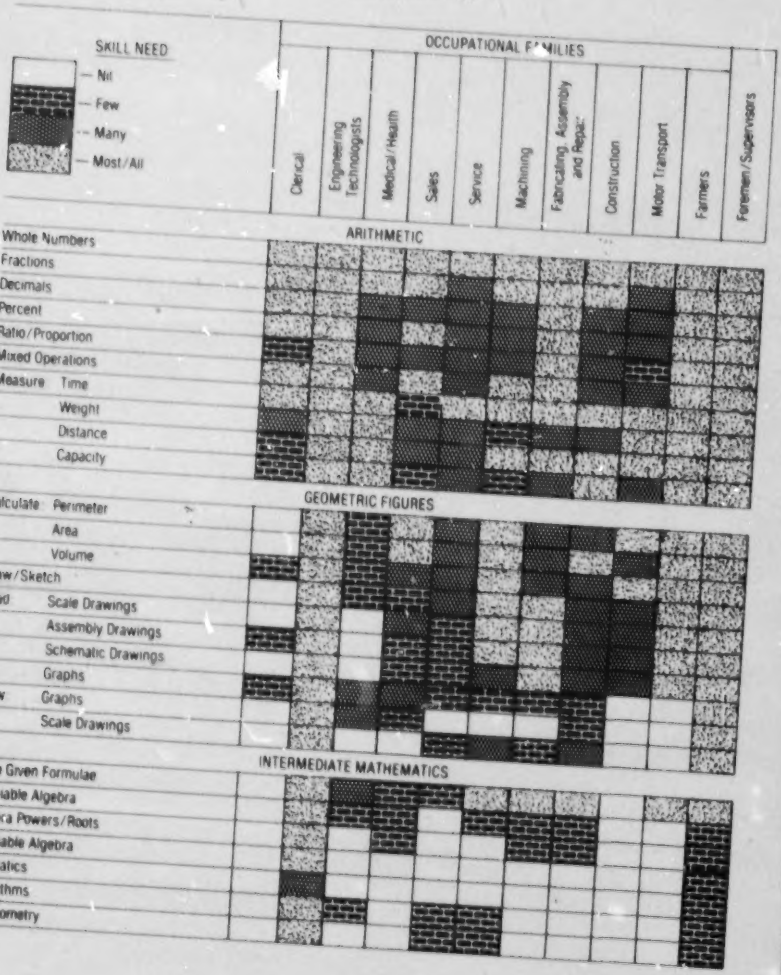
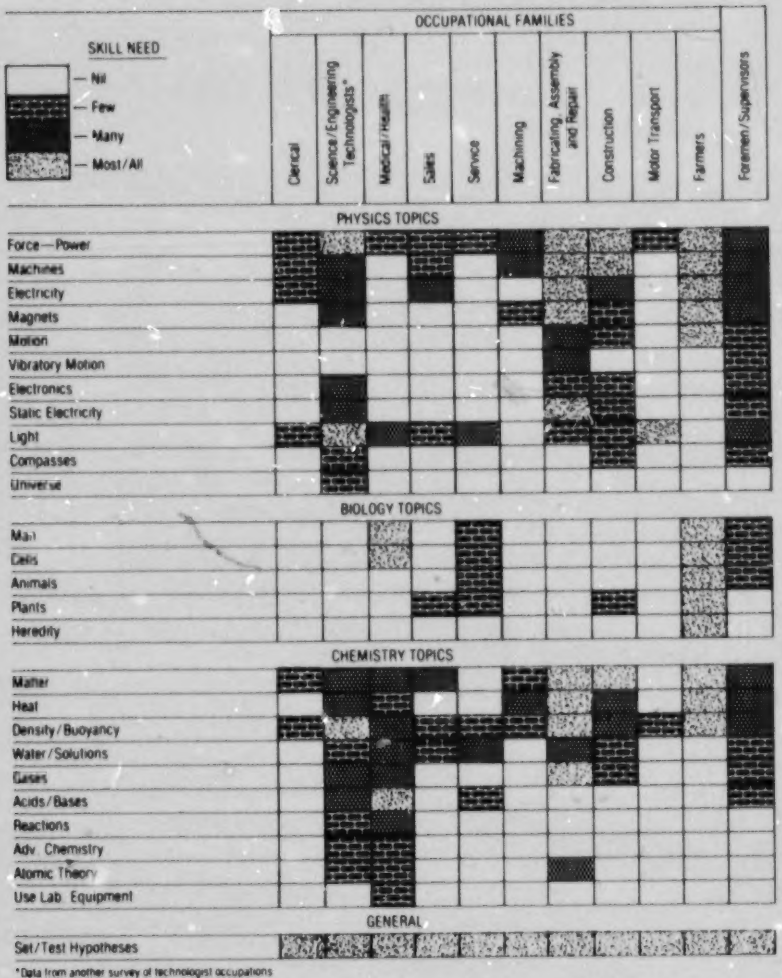


Figure 4

GENERIC SCIENCE



*Data from another survey of technologist occupations carried out by the Province of Ontario are included

edge is an important key to changing to other jobs at the same or higher levels.

Implications

Training and education programs can use this information to:

(1) understand the differences between the knowledge and skill contents of the curriculum and their applicability to specific jobs and related occupations;

(2) examine the skill capacities that are exercised and developed in the course of the program in relation to their usefulness on the specific jobs and in related occupations;

(3) consider the possibility of focusing on skills as an object of assessment (testing) as distinct from assessing knowledge acquired;

(4) use similar skill requirements of programs and occupations as a linchpin for integrating training program content or knowledge-based academic curricula.

Our sense is that many job-specific and more general education and training curricula do not recognize these distinctions, focus more on knowledge acquisition and thus have an unnecessarily narrow understanding of the applicability of the training in the world of work. This perspective, in turn, is communicated to students who feel restricted in assessing what they are able to do and the occupational fields for which they may be qualified, even though they may not be "trained" in them. Indeed, if the patterns of major occupational group change outlined earlier are accurate, people are more versatile

than might be expected. Employers probably recognize this, but perhaps educators do not.

If the logic of the considerations above is accurate, several needs emerge. We might consider these additional areas for inquiry and thoughtful planning.

1. Patterns of occupational change should be looked at not in terms of occupational titles and industries, but rather with an eye to uncovering the human performance requirements (knowledge, skills and attitudes) that are consistent across a variety of occupations.

2. Ways of allowing students the opportunity to apply their skills and knowledge in a variety of situations should be explored in all educational training programs. When such applications are possible, trainers should point out to students the similarities of the performance requirements.

3. The process of transferring performance ought to be more closely examined and better understood. It remains a mystery why some students can deal with a variety of situations with similar requirements and some cannot. Perhaps there are sets of skills, knowledge and attitudes that facilitate transfer of performance, and it is not enough for the instructor to simply point out the similarities.

The project on Transferable Skills will be exploring these issues in the coming years. In addition, we will be seeking ways to help educators, trainers and employers use these ideas. Any comments or suggestions you may have would be greatly appreciated.

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SITUATIONAL INFLUENCES ON WOMEN'S CAREER DEVELOPMENT

P. Kay Coleman, Barbara Strudler Wallston & Norma Calway-Fagen

SUMMARY

Women's career development theories and research on careers are reviewed. It is argued that theories of career development constructed for men do not adequately account for women's career development because of the focus on person variables and their failure to recognize gender role as a mediating variable. Situation variables which are important influences on women, including social-structural and life cycle variables, are explored. Research on dual career couples conducted by Dr. Wallston is used to exemplify the importance of situation variables. Ms. Coleman addresses how these factors are relevant to industry and how industry can apply this theory and research. The literature review relies heavily on Dr. Calway-Fagen's work (1978).

INTRODUCTION

The U. S. Department of Labor publishes annual statistics on the numbers and percentages of women

and men employed in the labor force. Over the past decade, reports have shown a steady influx of women into the labor market, and today 51% of American women are employed full-time outside of the home. Affirmative action programs and equal opportunity legislation have certainly opened many doors and presented new challenges for organizations which must integrate women into a predominantly male work group. However, it is important to note that the gains women have made are uneven, particularly in the area of employment. Specifically, women have not attained true equality with men in respect to occupational status, options, and training (Knudsen, 1968).

Progress has been hampered in part because of the prevailing social norm of woman-as-homemaker which, as presently defined, conflicts with current occupational roles. Thus, an assumption underlying the following discussion is that women are part of an environmental context that includes their home and society at large. Following from this assumption is the view that career conflicts as experienced by women are not solely individual experiences with individual causes and cures, but rather must be understood as transactions between women and the various aspects of the environment.

From this perspective, it may be possible to identify certain systemic barriers which impede the professional growth of women. These will be taken up in the last two sections of this paper.

LITERATURE REVIEW

In studying the career patterns of males, it is possible to concentrate solely on their patterns and choices

and to pay only incidental attention to their lives off the job (Ginzberg, 1966). And, in fact, most major theories of career development or choice are largely reflective of the male career cycle. For example, one can predict with reasonable accuracy that a professional male will climb the success ladder in regular and even sequence from implementation of career to stabilization during his 20's and 30's as Super's theory posits. However, these are the very years when many women drop out of the occupational world to bear and rear their children (Epstein, 1970). Thus, rather than exhibiting vertical progression, women's careers can best be pictured in a step-wise fashion with periods of layovers. As presently conceptualized, these theories do not adequately account for the special nature of women's careers since they fail to emphasize the impact of nonpersonal (i.e., situational) variables (Osipow, 1977). Although men's and women's career development share many similarities, it is clear that society and its organizations exert differential impact on careers as a function of sex (Osipow, 1977).

In order to better understand the need for examining situational variables in women's career development, it is necessary to review the three major theories of vocational development as postulated by Ginzberg, Super, and Holland. These theories are similar in that they all view career development as an ongoing process throughout the various stages of the life cycle. Their differences lie in the aspects of the vocational/developmental process which they emphasize.

Ginzberg et al.'s (1951, 1966) theory maintains that the vocational/development process becomes increasingly irreversible over time. The notion that

occupational choices lead eventually to a particular career path decision stems from his view of the process as both systematic and predictable. Furthermore, the eventual choice is the result of a compromise between what an individual perceives as ideal and what he/she considers to be realistically attainable.

Donald Super (1953, 1963) introduces the notion of self-concept into the developmental process. He believes that career decisions and vocational choices are made by individuals attempting to implement their self-concepts by maximizing their opportunities for self-expression. The focus is on the vocational self-concept as the individual moves through the various stages of the life cycle and experiences its changing demands.

Holland (1959), on the other hand, sees inadequacies in both Ginzberg's and Super's theories for integrating present knowledge or encouraging further research. His theory assumes that at the time of vocational choice, an individual is a reflection of the interaction of heredity and a variety of cultural and personal forces. Based on this interaction effect, Holland conceptualizes occupational environments with corresponding personality orientations that help to match individuals with congruent work environments.

All three theories are derived from research data on middle class males and, therefore, cannot be generalized beyond them. To understand women's career patterns and life stages, one must begin to place more weight on the cultural factors which influence choice. While many factors are related to work orientation and career development, the effects of these variables are mediated by sex roles (Osipow, 1977). Evidence (O'Leary, 1974) suggests that the occupa-

tional world may present real attitudinal barriers to the advancement of women. These barriers in part result from norms and beliefs which: a) prohibit women from exercising authority over men; b) view women as lacking in competence and dependability; and c) view female commitment to work as little more than a desire to earn spending money. Moreover, the current model of success as expressed in career patterns is appropriate essentially for the male sex role.

It is hoped that this brief review of the literature has provided sufficient support for the argument that women's career development needs to be understood within its environmental context, and that one must look beyond the personal to the situational variables that affect women's careers. Specifically, the organizational environment itself needs to be examined if one is to identify structural and systemic barriers to women's professional growth and development.

RESEARCH SECTION

Research done on dual career couples in conjunction with Michael Berger and Martha Foster (Wallston, Foster & Berger, 1978; Berger, Foster & Wallston, 1978) illustrates the importance of situational influences. It also illustrates that such influences might be incorrectly attributed to personal factors because of the confounding of these in real world situations. Finally, the differential influence of individual difference or personal factors depending on the amount of situational constraint will also be illustrated. Thus, we argue that to understand women's career development, we must incorporate situational

and personal variables. While many theories have given too much weight to personal factors, we argue for a reemphasis on situational factors. This is particularly important for deciding intervention strategies.

Method

All the data to be presented here come from one national survey of dual career couples in psychology and biological science.[1] People who received their Ph.D's between 1972 and 1974 were surveyed in 1974-1975. Responses were received from 427 (or 28%) of the 1505 couples located. The final sample of professional couples included only those 160 couples in which both spouses had the recognized terminal degree in their field. There were 107 couples recruited from psychology (i.e., at least one spouse had a Ph.D. in psychology) and 53 couples recruited from biological sciences (at least one spouse had a Ph.D. in biochemistry, microbiology or physiology). References to the psychology sample (or couples) and the biological sciences sample include males and females in each of these fields and their spouses who might be in any field.

Questions were asked about the first time the couple searched for jobs after both were professionals. To be eligible, this first job search had to occur within five years of completing the questionnaire.

Psychology couples ranged in age from 22 to 60 with a mean of 31.8. Biological science couples had a mean age of 31.5, with a range from 26 to 52. They were married a mean of 6.5 years (standard deviation = 5.39), while psychology couples were married a mean of 7.4 years (s.d. = 6.36).

Spouses were asked to independently complete questionnaires which were mailed to them. Self-

report questions on personal experiences related to job seeking composed the bulk of the questions. In addition, three hypothetical situations (referred to hereafter as simulations) were presented for response. These varied along a situational dimension, allowing a controlled test of situational influences. Two forms of the simulations were used in which the sex of the persons was reversed.

Simulation 1 presented positive conditions for egalitarian job seeking pitted against a better alternative for one of the partners (termed "good job alternatives" in Table 1). Simulation 2 included "reduced job availability" as a constraint. Simulation 3 added time pressure as a constraint in addition to reduced job availability (termed "late in the job hunt" in Table 1).

Table 1

SIMULATION DATA SUMMARY

	Simulation 1 Good Job Alternatives	Simulation 2 Reduced Job Availability	Simulation 3 Late In The Job Hunt	TOTAL
Psychology Sample				
Egalitarian	162 (79%)	109 (53%)	47 (24%)	318 (52%)
Non-Egalitarian	43 (21%)	95 (47%)	154 (76%)	292 (48%)
Biological Science Sample				
Egalitarian	69 (74%)	46 (49%)	17 (19%)	135 (48%)
Non-Egalitarian	24 (26%)	48 (51%)	75 (81%)	147 (52%)

(Data from Wallston, Foster & Berger, 1978 and Foster, Wallston & Berger, 1978.)

One form of Simulation 1 is presented below.

Bob has received an outstanding job offer. His wife, Sue, has been unable to locate a position in

the same geographic area. Both Bob and Sue have received moderately attractive offers in another location which is quite distant from the first. It is relatively late in the year and chances of obtaining alternative positions seem dim.

Respondents were asked to select the alternative they would be most likely to take from the following:

A. Bob and Sue accept the two offers.
B. Bob accepts the more attractive offer and Sue comes along, hoping to find something.
C. Bob accepts the attractive offer, and Sue accepts her offer. They will live separately for the time being.
D. They decline all offers and continue looking.

Analysis of Situational Influences

Simulations. As expected, analysis of the simulation data showed strong situational influences. See Table 1 for a summary of these data collapsed over the two forms. Overall, there were a great many egalitarian choices (approximately half of all choices), but the proportion of such choices varied according to the situation. Egalitarian choices were most common when they resulted in two jobs as in Simulation 1. This did not vary by form ($X^2 = 0.46$ for psychology; $X^2 = 2.03$ for biological sciences). In other words, whether it was the male or the female who had the outstanding offer was irrelevant to whether the choice was egalitarian or nonegalitarian.

Egalitarian choices were least common when only the nonegalitarian choices resulted in a definite job (Simulation 3). This also didn't differ depending on

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whether it was the wife or the husband (i.e., by form) who had the single offer ($X^2 = 0.31$ for psychology; $X^2 = 1.99$ biological science). Simulation 2, with the situational constraint of reduced job availability but not the time pressure, produced egalitarian choices between these two extremes. While for the psychology sample this did not differ by whether the wife or the husband had the good job offer ($X^2 = 0.07$), for the biological science sample ($X^2 = 8.33$ $p < .005$) more traditional nonegalitarian choices (i.e., wife follows husband, 64%) than nontraditional nonegalitarian choices (i.e., husband follows wife, 34%) were made[2]. Overall, the proportion of egalitarian choices was the same for the psychology and biological sciences sample for each simulation.

Actual decision making. The actual job decision-making forms an interesting parallel to the simulation data. Couples were asked to categorize their decision rules and their final decision. These responses were collapsed to form parallels to the simulation data. They are summarized in Table 2.

The decision rules are somewhat parallel to Simulation 1, with few situational constraints. A relatively high number of these choices were egalitarian (61% psychology; 42% biological sciences). For both samples, where choices were nonegalitarian, unlike in the simulation data, sex did make a difference; women were more likely to follow their husbands than vice versa ($X^2 = 13.36$, $p < .005$ psychology; $X^2 = 28.53$, $p < .001$, biological science). However, unlike in the simulations, where all other things were equal, sex in these samples is partly confounded with level of degree, years of experience, the realities of the job market, etc.; therefore, some of the influence of sex

Table 2

ACTUAL JOB DECISION MAKING

	Initial Decision Rules	Final Decision
Psychology Females		
Egalitarian	59 (6 %)	24 (25%)
I Lead	10 (10%)	13 (13%)
I Follow	28 (29%)	60 (62%)
Psychology Males		
Egalitarian	60 (61%)	24 (29%)
I Lead	26 (26%)	43 (52%)
I Follow	13 (13%)	16 (19%)
Biological Sciences		
Females		
Egalitarian	20 (39%)	10 (21%)
I Lead	5 (10%)	5 (11%)
I Follow	26 (51%)	32 (68%)
Biological Sciences		
Males		
Egalitarian	22 (46%)	9 (21%)
I Lead	22 (46%)	29 (67%)
I Follow	4 (8%)	5 (12%)

which appears to be a personal or individual difference variable may mask situational influences which are apparent in the simulations.

This is particularly clear in the data on final job decisions. These parallel the findings for Simulation 3 where there were heavy situational constraints. The percentage of egalitarian decisions is quite low (although still over 20%) and similar to that for Simulation 3. Once again, in contrast to Simulation 3, sex is an important variable, men were more likely to take jobs and women to follow them ($X^2 = 40.19$,

$p < .001$, psychology; $X^2 = 38.23$, $p < .001$, biological science). These data closely resemble the responses to Form 2 of the simulation. The fact that Form 1 (where the wife had a good job offer) produced similar findings with the husband following suggests that lack of job offers to women may be one of the reasons for the relatively traditional final job decisions.

Recategorization of the final job decision data in Table 3 strengthens this parallel. A large proportion

Table 3

RECATEGORIZED FINAL JOB DECISION

	Psychology		Biological Sciences	
	Females	Males	Females	Males
Egalitarian	24 (25%)	24 (29%)	10 (21%)	9 (21%)
Only One Good Job	34 (35%)	34 (41%)	17 (36%)	24 (51%)
Other Non-Egalitarian	39 (40%)	25 (30%)	20 (43%)	10 (23%)

of the nonegalitarian decisions occurred because only one good job was available. Thus, only about one-third of the sample freely made nonegalitarian decisions.

Thus, the simulation data where situations were systematically varied provides a helpful perspective on the actual job decision-making data. Adding a relevant individual difference variable provides an additional perspective on these data.

Analysis of Feminism's Influence

Respondents were asked to report the degree to which they considered themselves to be feminists; using as a definition "someone who believes in total equality between males and females." It was expected that this individual difference characteristic might influence the extent to which other responses were

egalitarian. The findings show how strong situational constraints can override individual difference considerations.

Simulation data. Grouping people into those who responded "definitely" to the feminism question, termed "feminists," and all others (since "definitely not" was rarely reported and is not socially desirable, it was combined with "somewhat"), termed "nonfeminists," the simulation data reported above were reanalyzed with this factor included.[3] The data are summarized in Table 4. Where there was

Table 4

SIMULATION DATA AND FEMINISM

	Simulation 1 Good Job Alternatives	Simulation 2 Reduced Job Availability	Simulation 3 Late in the Job Hunt
Female Samples			
Nonfeminist			
Traditional Response:	11 (65%)	16 (76%)	19 (90%)
Nontraditional	6 (35%)	5 (24%)	2 (10%)
Feminist			
Traditional Response:	6 (13%)	21 (33%)	50 (79%)
Nontraditional	39 (87%)	42 (67%)	13 (21%)
Chi Square	16.36 P < .001	11.74 P < .001	.73* P > .1
Male Samples			
Nonfeminist			
Traditional Response:	11 (52%)	18 (62%)	26 (90%)
Nontraditional	10 (48%)	11 (38%)	3 (10%)
Feminist			
Traditional Response:	8 (22%)	25 (47%)	39 (74%)
Nontraditional	29 (78%)	28 (53%)	14 (26%)
Chi Square	5.75 P < .05	1.67 P > .1	3.03* P > .1

*Yates Correction Applied

flexibility, as in Simulation 1, feminists were more likely to respond in a nontraditional manner and nonfeminists in a traditional manner. However, with the strong situational constraints in Simulation 3, self-reported feminism was not a significant predictor. Simulation 2, where there are some constraints, produced results between these. Among the female sample, feminism was a significant predictor. This was not the case in the male sample. Data on actual job decisions are parallel.

Job decision making. Data on actual job decision making are summarized in Table 5. The final

Table 5

ACTUAL JOB DECISION MAKING AND FEMINISM

	Initial Decision Rules	Final Decision
Female Sample		
Nonfeminist		
Traditional Response	15 (39%)	20 (56%)
Non-Traditional Response	23 (61%)	16 (44%)
Feminist		
Traditional Response	38 (35%)	67 (64%)
Non-Traditional Response	70 (65%)	38 (36%)
Chi Square	0.22 P > .1	0.77 P > .1
Male Sample		
Nonfeminist		
Traditional Response	22 (45%)	23 (53%)
Non-Traditional Response	27 (55%)	20 (44%)
Feminist		
Traditional Response	23 (25%)	40 (51%)
Non-Traditional Response	68 (75%)	38 (49%)
Chi Square	4.91 P < .05	0.05 P > .1

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job decision, where there were heavy situational constraints, forms a clear parallel to Simulation 3 described above. Here, a majority of choices were traditional, and this did not vary as a function of feminist orientation.

Initial decision rules were more similar to Simulation 2, with some constraints. Only among males did feminism predict significantly to traditionality of choice. This was slightly different from the simulation data, where the significant effect occurred for females. A major difference among these data is that simulation responses were entirely independent, while couple decision rules, although independently characterized, were at some time jointly determined by the couple. Since a nontraditional strategy involves the husband accommodating the wife, it is not surprising that his feminist orientation is a better predictor than hers. Alternatively, we can see these data as suggesting that even feminist men get their way. It also must be remembered that the feminist self-characterization occurred after job hunting. Since men may be less accustomed to using the label feminist, their job-seeking behavior might have had a strong influence on their willingness to use this label. Women, on the other hand, may have many other behaviors and situations relevant to the self-attribution "feminist." There is some independent evidence of this, in that self-reported feminist women were significantly more likely ($X^2 = 5.24$, $p < .05$) to report engaging in women's movement activities.

Women's Career Patterns[4]

Data from the women who responded to the dual career couple survey were analyzed to assess patterns among women's careers. Using individual dif-

ference and situation variables, groupings of women were empirically determined (using hierarchical cluster analyses). The procedures were relatively complex including techniques for cross-validating the findings and will not be reported in detail here.

Four clusters of women optimally described the sample. See Table 6 for a description of the groupings. The groups differ on their experience with job

Table 6

EMPIRICALLY DERIVED CAREER GROUPINGS OF WOMEN

	1 "Negative"	2 "Somewhat Positive"	3 "Mixed"	4 "Very Positive"
Variables				
No. of Types of Positions Applied	2.26_{AB}	2.22_{AB}	2.56_{B}	1.58_{A}
No. of Offers Received	2.32_{A}	2.44_{AB}	2.76_{AB}	3.03_{B}
Satisfaction with Job	3.01_{A}	8.23_{B}	13.82_{CD}	14.03_{D}
Stress of Job Seeking	6.09_{B}	5.04_{B}	7.67_{C}	2.83_{A}

Note: Within a row, means with a subscript in common do not differ significantly at the .05 level.

hunting. There is a clearly negative group who experienced moderately high stress during job seeking, expressed low satisfaction with their final job, received fewer job offers, and applied for a moderate number of different types of positions. There is a clearly positive group who experienced relatively low stress in job seeking, expressed extremely high satisfaction with their final job choice, received a high number of job offers, and applied for few different types of positions (i.e., knew the kind of work they

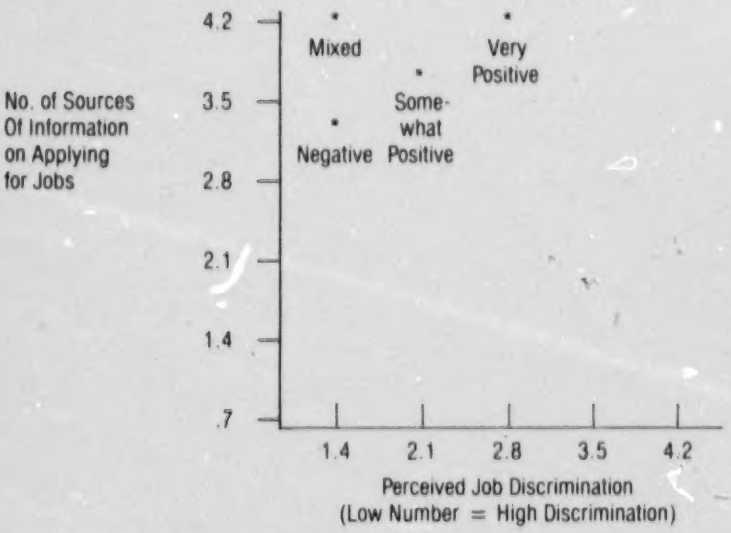
were interested in and went after it and/or felt confident that diversified job hunting was unnecessary). The other two groups are more difficult to categorize but vary along these dimensions.

Additional analyses (discriminant analyses) were conducted to determine what situational and/or individual difference variables best discriminated between these groupings. Although the discriminating variables are viewed as predictor variables, it must be remembered that all data are correlational in nature and it is not possible to be certain of direction of causality.

Figure 1 shows the best predictors and how they differ among groups. The number of different sources

Figure 1

Plot of Group Centroids



of information available in applying for jobs and perceived job discrimination are the best predictors. The negative group perceived more discrimination and had fewer information sources available than the other groups, while the clearly positive group was opposite on both dimensions.

For this discussion, the importance of these findings is that both predictors reflect situational factors. This gives added credence from a very different kind of analysis to the importance of situational variables in understanding women's career development.

Discussion

Three different analyses of data from one survey of dual career couples have been presented. Although our model of understanding human behavior implies the importance of both individual difference and situation variables, there is a clear indication from these data that situational variables are particularly important for understanding women's career development. When situational constraints are strong enough, the influence of individual differences is severely curtailed; this is clearly illustrated by the data on feminism. Theories of career development posited to understand male behavior place too much emphasis on individual difference factors and are not useful in understanding women's career development. New theories which give sufficient weight to situational factors must be developed if we are to understand women's career development within the context of a sexist society.

These findings have important implications for intervention strategies. If situational factors are primary, then intervention must aim at changing situations rather than at changing women. The next

section further delineates specific intervention strategies which recognize the influence of situational factors.

APPLICATION AND INTERVENTIONS

Attitudes are a part of people and organizations. How they get played out is of primary concern. Organizations today are mandated to provide a work environment that is free from discrimination, including discrimination in its subtle forms. The only problem here is that subtle discrimination is very difficult to identify and most people pass it off as a trivial concern of over-sensitive women and minorities. Rowe (1978) states the problem very succinctly:

> Several writers and analysts suggest that 'micro-aggressions' and 'micro-inequities' in the aggregate constitute formidable support to racism and sexism. Since they have to be ignored, denied, or dealt with, they take up time and psychic energy. . . . Many people who work with women's problems in organizations think that if women are going to succeed, they have to earn the respect of colleagues who harass them. Most believe that this is best done by excellent work and maintaining a professional demeanor. But it isn't easy to take on the responsibility of dealing in a mature way with someone who is harassing you. And some women and minorities are offended by what they see as further injustice in this prescription for success, since it requires a victim to bear the original aggression and then seek her or his own redress as well. . . . Many blacks and women might be perfectly willing to try and defend and assert themselves, but at the same

time they know that they will pay for their self-defense. Many white males expect a subtle deference from minorities and women, not assertiveness. One has to be willing to be called aggressive, bitchy, uppity, castrating, and humorless — and, understandably, many people hate being thought of in these ways more than being pushed around.

Recent research on women's "fear of success" has found that women do not fear success but rather the negative social sanction that occurs as a consequence of deviating from sex-role standards of behavior (Condry & Dyer, 1976). Obviously, then, organizations must find constructive methods of dealing with a management problem that has the potential to severely affect the morale and productivity of its employees.

Many organizations have taken a proactive stance in developing affirmative action programs which include awareness training for both their male and female employees. In addition, they are beginning to offer skill-building seminars for women in such areas as assertiveness training, management skills, and leadership training. Granted that the intent is positive and some women and minorities need the skills to survive and/or succeed in a predominantly white male environment, there is still an underlying assumption that women are the only ones who need to change.

This approach focuses on "the victim" of discrimination and, thereby, has the potential for increasing the negative self-concept of the "disadvantaged" persons who must feel flawed if so many changes in behavior and attitudes are re-

quired to succeed. All of this evokes guilt and frustration among white male managers. An awareness is gradually emerging that dealing only with the disenfranchised harms that person and may produce resistance in others. This existing model of affirmative action is being challenged by people who believe that the goal is not to homogenize minorities and women, but to reappraise and restructure the corporation to include values that are feminine as well as masculine and minority as well as majority. (Sargent, 1978)

It is at this point that we wish to offer our own recommendations for incorporating into the human resources management function of corporations this awareness of the situational barriers facing women (and minorities). According to Juanita Kreps, this is "the second bottom line for corporate social responsibility. The first line is profit, the second is the concern for social factors such as the utilization of human resources and of environmental resources" (cited in Sargent, 1978, p. 19). And, as a growing part of the human resources of today's organizations, women's career development is a vital management concern.

Recommendations

1. Employee Relations/Personnel Representatives: As the experts in handling personnel "problems" and employee grievances, they need to be made sensitive to situational variables that can be at the root of interpersonal conflicts. In looking first at male/female dynamics before analyzing the individual per-

sonalities involved, they can escape the tendency to blame and prescribe individual cures and, instead, seek constructive ways of correcting and preventing the situations that give rise to such conflicts. This is a proactive/preventative management practice rather than a reactive one.

II. Performance Appraisal Systems: Managers and supervisors being trained to appraise employee performance need to be encouraged to evaluate the individual within the environmental context in which performance is carred out. Particular areas to watch out for are teamwork, delegation, use of internal resources, and other areas that involve cooperation from others. These areas could be signals for the astute manager that there are attitudinal barriers that individual women cahnot confront alone or in isolation. To rate a woman low in one of these areas would be further injustice, i.e., blaming the victim, and irresponsible on the part of management.

III. Skills Training Programs for Women: In conducting workshops on assertiveness training, influencing skills, leadership skills and the like, trainers need to incorporate a segment on re-entry. Re-entry would focus on the realities of the work environment which would include the costs and benefits of using the newly learned skills as well as some of the negative consequences that result from conflicting sex role expectations. Otherwise, an individual woman may feel inadequate

and incompetent, and personalize the rejection that many women face in these transitional times.

IV. Skills Training Programs for Managers: Management skills development seminars need to go beyond the traditional areas of organizing, delegating, etc., and focus more on developing subordinates which, of course, includes women. Training for giving feedback is one important skill that everyone needs, but especially supervisors who withhold or refrain from giving constructive feedback to women out of an ingrained fear that they will cry or become emotional. Other skills that should be taught are listening skills, empathy, team-building and cooperation, and conflict resolution.

V. Career Development Programs: Included in the assumption that career development is an organizational and individual joint responsibility is the belief that it is an ongoing process and, therefore, cannot be written off with attendance at one seminar. As such, career development needs to be an integrated system that starts with the recruiting function and goes through retirement planning. An integral part of any career planning process is the need to know what the jobs are and the various paths one can take to get them. It is imperative that corporations institute job posting systems if there is going to be any semblance of equal opportunity and organizational responsibility for facilitating the career development of its employees.

These five recommendations are admittedly only a beginning. Much work needs to be done before organizations are entirely rid of sex and race discrimination, especially in its more subtle, covert forms. By focusing on women's career development as a management concern, we have argued that situational and systemic barriers need to be identified and eliminated if effective utilization of all human resources is to be achieved. It is our hope that gender role will become less conspicuous as a mediating variable as the numbers of women in management increase.

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FOOTNOTES

[1]The research presented was supported in part by Biomedical Sciences support Grant FR—RR07087 from the General Research Support Branch, Division of Research Resources, Bureau of Health Professions, Education and Manpower Training, National Institutes of Health.

[2]These choices were made by different people but since forms were randomly assigned to respondents, it is likely that the difference in nonegalitarian choices is due to differences in the forms. In Form 1 two egalitarian choices were contrasted with one traditional nonegalitarian choice (husband follows). In Form 2, two egalitarian choices were contrasted with one traditional nonegalitarian choice (wife follows). While 64% of the latter sample made the nonegalitarian choice, only 34% of the former sample made the nonegalitarian choice.

[3]Only those simulations which allowed a traditional response (Simulation 1, Form 1, and Simulations 2 and 3, Form 2) were used for these analyses.

[4]These data analyses were part of a dissertation conducted by Norma Calway-Fagen (1978).

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TRAINING: A MEANS, NOT AN END

Roger Kaufman

SUMMARY

Training is a means, not an end. It is only one of several alternative ways in which behavior may be changed. When we focus upon training, and assume that training is appropriate, we often are greeted with equivocal results. The tendency to do this is reinforced by our training as trainers, our professional activities, and our failure to see the relationships as well as differences between means and ends.

This work suggests an additional referent for training — it suggests that we go beyond training, beyond front-end analysis, beyond our organizational boundaries in order to determine our goals and objectives. By selecting our intended results in terms of current and future societal requirements, our means (such as training or organizational development) will be more likely to be successful. By so doing, we will be more successful and responsive, and save time, money and resources. It requires a major shift in thinking and action, however, from focusing on means to including ends.

Training as a Means

We pretty much know how to train successfully. There is a wide variety of models — which work — for bringing about predictable change in human performance (cf. Branson et. al., 1975; Mager and Pipe, 1976; Harless, 1972; Gilbert, 1978). All these models are logical, systematic, and generally are capable of doing what they say they can do. Additionally, there are behavior change techniques, such as mastery learning (Bloom, 1968), which have been demonstrated as being effective. We have years of experience with these, including some performance data which demonstrates effectiveness, yet training goes on pretty much today as it did before these models and techniques were known. And organizations, pinched by inflation, still seek ways to cut costs and increase productivity through training. The early promises of educational technology are not showing extensively in reduced costs and new techniques.

One explanation of why things have not changed is that people within our organizations have made the decision either not to use what is known, or not to use the models and techniques correctly. Some isolated "miracles" have been wrought and wrote, but as trainers we still do not do much of what we know how to do.

A second explanation might be that when we do apply them correctly, the models and techniques frequently do not work as well as we expected, perhaps because we may be attacking the "low-payoff" end of the problem by focusing *only* on training and instructional technology. First, let us address the "use" issue. Some often-heard reasons

for not using our known knowledge base include:

- "It is just too complex to implement in a real world where we have deadlines and pressures."
- "My boss doesn't understand or appreciate these new ideas, so we get trained in them, but never get the time or resources to carry them through."
- "You just cannot train the really important tasks, such as management, supervision, thinking, problem solving, tactics, judgments, etc."

Reasons and rationalizations are often given for not doing that which many of us know will work only if we will do it right.

Additional Approaches

Training professionals have now started turning to other avenues to improve performance. Job aids are now being used and developed for a wide variety of applications. Human relations training and organizational development (OD) are thrusts which intend to help employees help themselves — to foster personal growth, build teams within organizations, manage in a democratic manner. By using organizational development procedures, it is assumed that the group will develop useful goals and objectives and derive and implement successful ways of achieving these results. So training professionals are discovering (really re-discovering, for OD has been around for a long time) human development procedures, and these are being bought at an increasing rate. Prediction: OD will be just about as successful as systematic training materials development. Why? OD is not an end, but rather is a means to an end —

a how-to-do-it, as are systematic approaches to instructional development.

Means are best selected on the basis of some results to be obtained, and if we have not really dealt with just what ends we want to achieve, then techniques, procedures, models, and good intentions will not likely result in organizational success. And we also do not usually address just *why* we want to achieve those ends.

Thus, good ideas (means) fail for the wrong reasons. OD and systematic approaches to training are all (well, almost all) useful; useful only if they are a solution to a worthwhile problem.

Matching Means and Ends

Matching means to ends is a tricky, often frustrating adventure. We do not, formally, attend to it very well. To do so would raise many uncomfortable questions about organizational purposes, departmental objectives, reasons for corporate effort, current territorial imperatives, and the like. It is easier to assume that these organizational results are useful, to implement schemes for reaching these results, and then wonder why our efforts are not entirely successful. Currently, our organizational goals and objectives are based more upon conventional wisdom than they are upon real-world needs assessments and analysis. We continue to train (and develop), and are usually struck with how our accomplishments fail to reach our expectations. So we can continue to try new methods and techniques of training, as we have in the past. Or we can stop dealing with the symptoms and go beyond training. Beyond training?

Following are variables, which when taken together, may hold some answers to our previous frustrations.

Organizational Elements

In any enterprise there are five elements which, when linked and related, form a comprehensive view of the whole. Let's take a closer look at these elements.

Outcomes. Every organization, public or private, impacts upon society. Phone companies have clients and provide for them to interact over distances; car companies provide transportation for people; drug companies supply relief or prevent disability. All do something of value (directly or indirectly) for people in society or they will usually cease to exist. People, by and large, put money where their values lie, and companies respond to values and the money clients send to "chase" them. No worthy outcome (impact in society): no money. Simple. An outcome, then, is the impact of any organizational results (outputs) upon people, individually and collectively, in society. If an effort and its related results have an impact on self-sufficiency, or at least survival, then they are an outcome (Kaufman, 1972; Kaufman and English, 1979).

Outputs. These are the aggregated results of an organization taken as a whole. These are results of a company such as cars sold, drugs sold and dispensed, telephone calls made, etc. Add up all of the products of a company, deliver them, and you have outputs. Outputs are those organizational results which are delivered to society.

Products. These are the en-route results within organizations: phones manufactured; television sets completed and ready for shipping; drugs manufactured, bottled and ready for distribution; cars completed, inspected, and ready for delivery to dealers. If you are a part of a training department of an organization, you might have a completed and validated training program — that also is a product. Products are the internal results that an organization completes while en route to outputs.

Products are most familiar to organization people. Within an organization, each section, unit, department or subsidiary might develop products. An automobile company might have several divisions, each turning out cars and trucks. They might also have other divisions which turn out components, such as radiators, air conditioners or transmissions. Thus products from each of these component organizations may be aggregated into a larger product such as a car or truck. Thus, there are several types of products which may be seen within the context of a given organization: put them all together and you have yet another product. When you release them from the company (sell to a consumer, to an independent dealer, or to an autonomous rent-a-car corporation), then these are the outputs, i.e. when they leave the organization they become outputs.

Thus:
completed transmission = product
completed chassis = product
completed engine = product
complete car = product
sold car = output

Processes. Processes are the how-to-do-its. These might include assembly line techniques used to make the drugs, cars, or television sets. Processes also include the management tools such as organizational development, management by objectives, Theory Y, democratic management and decision making, team building, or any of the methods and means which help people produce products. The systematic approaches to training design, development and evaluation are also examples of training processes. When we use the process correctly, we should get useful, quality products.

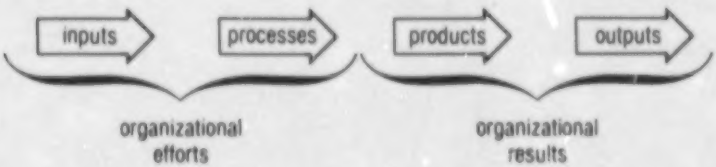
Inputs. These are the raw materials, resources, and existing requirements and purposes of an organization. Inputs include raw materials (e.g. sheet and tube steel, chemicals, wires and transistors) which are processed on the way to becoming products. Inputs include policies and regulations of an organization, or laws which govern a corporation. Inputs also include goals, aims, purposes, needs, values. People and equipment which can be brought to bear as part of organizational efforts are also inputs.

Beyond Training

These five "organizational elements" define an organization and its external environment, and they are important for those of us who would be successful by going beyond training. Training is just one option within one element. Selecting and optimizing one option within one of five elements alone may be risky.

Let us first look at these elements aggregated within major clusters. First those that relate to organizational efforts: inputs and processes. These two ele-

ments relate to what an organization does, and what it uses to do them. But inputs and processes *by themselves* are not very functional because they cannot replace the products they intend to produce — they are means, not ends. So we add the other two within-organization elements: products and outputs:

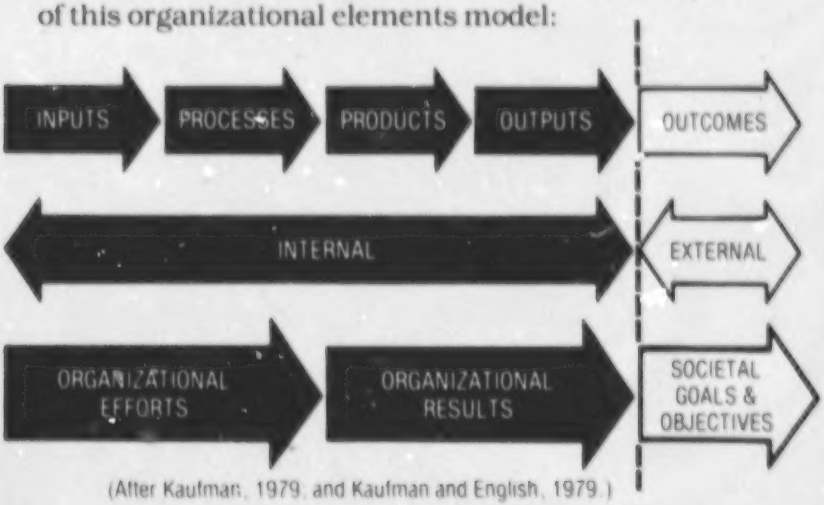


Thus, we can view the total picture from within, or *internal* to any organization. Inputs are obtained, applied, managed and orchestrated using processes, and these processes yield en-route results (products) which, when aggregated for an organization, are outputs. Let's walk through an over-simplified example.

A telephone company decides to be in the communications business. They have people who know how to make and sell telephones, they have telephone lines, people to sell and install as well as service telephones, funds to be in business, and stockholders' support and policies to do so. These are inputs. They manufacture phones in a plant and make the tools to sell and install them. They use production lines and manufacturing techniques to assure

that efforts are within cost and time requirements. These are the processes used. The phones are constructed, and they pass inspection. These are the products. They are shipped to operating companies, and they are sold to customers where they are installed and available for use. People outside the company are now clients, and the telephone company has aggregated the sold and installed phones as outputs. People use the phones to talk to each other, and they pay the phone company for their use. They like the services and use them at such a rate that the phone company shows a profit. The customers are pleased because they do not have to travel or send messengers. And not only is the company profitable and the customers satisfied, but society benefits from a savings in energy, and both the consumer and the company are self-sufficient. The results outside, or *external* to the company, are outcomes.

Let's look at both the internal and external parts of this organizational elements model:



(After Kaufman, 1979, and Kaufman and English, 1979.)

All organizations have these elements. How we use and relate them may hold a key to success.

Now let us revisit "training" and systematic designs for and of training. What are these in terms of the organizational elements? They are processes. They are how-to-do-its. Now suppose we only choose the training on the basis of the products we want to obtain. We do a front-end analysis (an internally-oriented tool, for it does not question outputs or outcomes), design the intervention (a training program systematically and empirically built), and obtain the product. O.K.? Well, maybe, but it might turn out to be true that the product is not useful to the company or the public. A retraining program may work, but the product fails; a bit like the physician who had a successful operation but the patient died. Can you think of any time your organization has turned out a product which wasn't useful? How about the drug that was harmful? The car that was dangerous, the phone that was unreliable, the TV that would not work through the warranty period. Bad design? Perhaps. But the best training program in the world cannot make up for a product which is useless or dangerous.

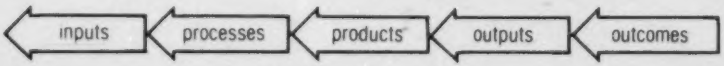
In some large systems, where training is to be developed before delivery of the product, the training analysis often identifies engineering and design problems early. Thus, training may be a design tool as well as a behavior-change tool. If training is to be an effective organizational effort, we should make sure that our products, outputs and outcomes are worthy. We should make certain we are training well, and also training to achieve careful results. We have to go beyond training.

Organizational development? Also a process. What good is it to develop people, build teams, increase trust and cooperation without knowing what the people are to achieve — their products, outputs, and outcomes? Thus the title of this article could be "Beyond Organizational Development," or perhaps "Beyond Interventions."

Conclusions

The thesis of this article is simple. We should develop an organizational element only when we know that the other elements are correct. And to make sure the elements are correct, we should design the total organizational effort and base organizational results upon current and future societal requirements.

A rational (and logical) model for ensuring that selected interventions (such as training) will be functional and useful would be:



Thus, design would begin with determining societal requirements, and deriving from that referent the outputs, products, processes and finally the required resources and inputs.

This is, admittedly, easier said than done. But can we afford not to start there? Our products will wind up there, so why not plan this utility from the beginning?

We should go beyond training, go beyond process, products, and even outputs and additionally consider the total organization as a means to societal ends.

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DEMYSTIFYING RESEARCH IN HRD— SIMPLIFIED RESEARCH GUIDELINES

Stephanie Jackson, Richard O. Peterson & Donna McNamara

SUMMARY/INTRODUCTION

Human resource development professionals and managers must often make decisions or recommendations with less information than they'd like. Sometimes a research study would provide the information, but time, money, and expertise to conduct such a study may be in short supply. These guidelines are designed to help the user increase the quantity and quality of information available in such situations. They offer guidance in systematically approaching such questions as:

- Is there any real difference between programs A and B?
- What will happen if we do X?
- Now that we've done X, did it work?
- Why did Y happen?

What this Document is: It's an outline of a set of systematic procedures for obtaining information to answer questions of the general types above. It assumes little knowledge of research methodology or terminology.

What it is Not: It is not a set of comprehensive guidelines for conducting research. It will not substitute for expertise in research design, implementation and analysis.

Who Should Use It: The document is meant for use by those charged with making decisions or taking actions designed to influence human behavior.

When to Use It: Consider using it when you're faced with any of the types of questions above, and when there's some time for research and analysis but not enough resources to conduct a full-scale study. The document may also be useful to guide your interactions with others who are conducting research.

STEP 1: What is the question?

First, analyze the question, to be clear about the kind of information you're looking for.

IF you have this type of question:	THEN:	EXAMPLES	
		Questions	Possible factors to look for
Is there any real difference between programs A and B?	You're looking for an expected difference in results factors from different programs OR from a change in action from the status quo.	What media should we use for the new self-paced program on equipment repair?	• Time to complete instruction. • Accomplishment of instructional objectives
What will happen if we do X?		Do we need special programs for women managers? Which one should we choose?	• Promotions among female managers. • Number of complaints grievances.
		Will this new measurement system really increase sales?	• Sales volume
Now that we've done X, did it work?	You're looking for a change in results after the fact — a difference in some measure of concern as a result of some action that's already been taken.	Travel arrangement procedures have been changed. Is the change working?	• Time spent per request. • Number of complaints. • Number of inappropriate arrangements made.

Why did Y happen?	You're looking for a causal factor — some action, event or circumstances that caused a change or difference in results.	Why is the safety record in Plant A so much better than in Plant B?	• Quality and availability of safety equipment. • Skill of workers. • Nature of work procedures. • Measurement and consequences of safety-related behavior.
		Employee attitudes regarding performance appraisal are down. Why?	• Consequences of good/bad appraisals. • Skill of appraisers. • Appraisal method/factors.

STEP 2: What will be done with the answer? What do you have to work with?

Next look at the resources and constraints of your situation — and consider the consequences of a "wrong" answer. Use the checklists below to review the situation. Then make a general decision about continuing the project.

WHAT WILL BE DONE?

- **How will the information be used?**
  - ☐ To decide between/among alternatives.
  - ☐ To decide whether or not to take (or rescind) an action.
  - ☐ As evidence to back up/negate a proposed action.
  - ☐ No immediate use planned.
- **What are the consequences of error?**
  - ☐ How much time and money are involved?
  - ☐ What is the potential effect on employees? On salaries? Promotions? Safety? Other factors?
  - ☐ What are the legal/EEO consequences?
  - ☐ What are the possible effects on products or services?

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WHAT DO YOU HAVE TO WORK WITH?

- **What resources are readily available?**
  - ☐ Available expertise?
  - ☐ Time and money?
  - ☐ Existing relevant information?
  - ☐ Research tools/materials available?
- **What are the constraints?**
  - ☐ Deadlines that must be met?
  - ☐ Actions that are prohibited? Information that's inaccessible?
  - ☐ Any predetermined actions?

SHOULD YOU CONTINUE? Among the major options are:

- ☐ **Continue** — resources seem appropriate in view of the need for and planned use of the information.
- ☐ **Request additional resources** — the planned use of the information has consequences that warrant an additional investment of time, money, and/or expertise.
- ☐ **Recommend discontinuation** — the use of the information doesn't seem to warrant much expenditure of resources.

STEP 3: Where should you start to look?

Assuming you've decided that it's worth investigating the question, the next step is to decide where to look for information. Use the guidelines below to:

- First, *identify* sources and types of information.
- Then, *obtain* as much information as is readily available.
- Finally, *review* that information before going on to the next step to decide whether you need to conduct a more formal investigation.

IF:	THEN:
Your're looking for an expected difference in results—the difference among possible alternatives, or the difference between the status quo and a change that's being considered.	• Check to see if the information is already available. ☐ Are there existing/documented rules or guidelines for choosing among the alternatives available? ☐ Have the programs you're considering been tried elsewhere under similar circumstances? What were the results? Are they documented? • Check to see if a change is truly desirable. ☐ Is there evidence that current results aren't satisfactory? ☐ Is the change mandated? Required for legal or practical reasons? ☐ Are you currently documenting/measuring results so that you'll be able to see the effects of any change you make?

You're looking for a change in results—the effects of a change or program that's already been put into operation.

- Review the nature of the change. Talk to those responsible and establish specific results to look for.
  - ☐ What did those who made the change expect to happen?
  - ☐ What seem to be possible or likely results?
- Once you've established what to look for, consider:
  - ☐ Are those results being documented/measured now?
  - ☐ Were they documented/measured before the change? In the same way as now, so that comparison is feasible?
  - ☐ Have standards been established for the level of results desired? What does management expect?
  - ☐ Do you need to know before-and-after differences? Or will it be enough simply to see if results now meet expectations?

You're looking for a causal factor—something that's changed to produce a different result, or something that's different between two situations to cause different results.

Look for changes or differences in each of these categories that might be causing the change or difference. Be sure to check each possibility; frequently there are more factors than one involved.

- ☐ skill and knowledge of personnel
- ☐ way work or results are measured
- ☐ standards applied to work or results
- ☐ feedback given to personnel about work/results
- ☐ consequences of producing the results in question
- ☐ physical environment in which people work
- ☐ resources—the information, tools, equipment that personnel have to work with
- ☐ nature of the work itself; the way work is done

STEP 4: Do you need to collect more information?

During the preceding analysis and information gathering, you may have found the answer to your question. If not, you'll need to consider the possibility of conducting a study to get more or better information. First, review Step 2 to remind yourself of what will be done with the information and what you have to work with. Then use the chart below as a general guide to your decision about what to do next. The chart offers general and partial guidance *only;* use it in the light of your knowledge of your own situation.

IF you're looking for:	AND:	AND:	THEN:
An expected difference in results	No documented rules or study results are available		Consider conducting a study or tryout to estimate the results you'll get in your situation.
	Some rules or relevant study results are available	There's some question about their applicability to your situation	
		It's clear that: • rules or study results are well-founded and • applicable to the people and circumstances of your situation	Unless there are special circumstances, you've probably got enough information to make your decision

A change in results	You can't establish the goals of the change/results expected from it.		It's questionable whether the change should have been made. Consider suggesting a needs analysis.
	Goals/expected results are established, but some are not now being measured.		Establish a measurement system, if the information is clearly worth getting.
	Goals/expected results are established AND being measured	No before-and-after comparison is possible	Check to see if measured results meet standards.
		A before-and-after comparison IS possible	You should have enough information to make your decision.
		No standards are established	Recommend establishing them.

A causal factor	Investigation shows that there's clearly only one factor that could've caused the change or difference.		You should have enough information to make your decision.
	Investigation shows several factors that might have caused the change or difference	It's possible to manipulate all factors to obtain (or remove) the change	You may wish to assume that all factors are responsible and not attempt to isolate the factor(s).
		It's critical to know which factor(s) are primarily responsible	Consider conducting a study to compare results of manipulating factors one at a time.

STEP 5: Plan the study.

If you've reached this point, you've decided to conduct some research — whether on your own or with the help of an expert. That means you'll probably be:

- making a change in a situation (manipulating a causal factor) and measuring the effects/results, or
- instituting two or more programs and measuring the difference in results/effects, or
- establishing a measurement system (and perhaps standards) to obtain new/additional information.

The basic steps in planning the research should include:

- Decide what to measure.
- Decide how to measure it.
- Decide when to collect information
- Decide from whom to collect information.
- Define or review causal factors.

The details of planning research are beyond the scope of these guidelines. However, the checklist below may help you review research plans. It's a list of things to look out for—common problems that can cause invalid research findings.

What's measured

☐ Critical results/effects not measured.

Example: A training program in sales techniques appeared successful in a study. Later, it turns out not to be useful because measurements were made only of sales techniques—not of the critical result, actual sales.

How it's measured

☐ Measurement procedures not defined.

Example: Two courses in effective writing were compared, and the apparently more successful one selected for implementation. It later turned out not to be the better choice, because results were measured by subjective judgment—no clear definition was made of the desired characteristics of "effective writing."

When information is collected.

☐ No "before" information available for comparison.

Example: A course in oral presentation methods was tried and deemed a success on the basis of carefully defined measurements. In fact, the course was largely wasted because students were able to perform most of the skills before they took the course, but no measurements were taken at that point.

From whom information is collected

☐ Trial population not comparable to intended users.

Example: A written procedure guide for automobile mechanics was tested and put into operation on the job. It proved ineffective because it was tested with engineers with much higher reading levels than the mechanics for whom it was intended.

☐ Information collected from "contaminated" population.

Example: A method of counseling in career planning was tried and pronounced a success on the basis of pre- and post-assessments of career plans produced by students. In fact, the counseling had minimal effect. Going through the pre-assessment enabled students to clarify goals and means, and to make much better career plans on the post-assessment—but no comparison was initially made with groups taking only the pre-assessment and groups getting only the counseling.

Causal factors

☐ Causal factor not carefully controlled.

Example: A training program that got good results in a study doesn't work when used later, because the exact method and content of training weren't documented and/or can't readily be duplicated.

☐ Causal factors not isolated.

Example: A new production method that appeared to produce good results during a trial doesn't produce comparable results later, because something else was operating to produce the trial results.

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